THE ROLE OF OUTDOOR RECREATION IN BUILDING

COMMUNITY RESILIENCE AND ADAPTIVE CAPACITY

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# THE ROLE OF OUTDOOR RECREATION IN BUILDING COMMUNITY RESILIENCE AND ADAPTIVE CAPACITY

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Abstract

For the first time, outdoor recreation theory is applied within the framework of resilience theory to define the conceptual relationship between recreation benefit outcomes and community resilience. A theoretical and practical disconnect between the two disciplines is evident from the lack of literature identifying conceptual and operational linkages. Emerging from the application is a Recreation System Community Resilience Framework that models agent behavior, embedded green space, networks of service providers and feedback mechanisms to demonstrate recreation connections to resilience concepts. The Recreation Benefits-Based Model is identified as the best fit to deliver sustainable high leverage and capacity-building resilience for communities. Anchorage, Alaska neighborhoods are chosen to test the operational relationship between the constructs of outdoor recreation opportunity diversity and community resilience and adaptive capacity. The findings indicate support for the hypothesis that community resilience increases as recreation diversity increases. The results demand widespread implementation of the Benefits-Based Model in order for recreation to fully participate in the community well-being, resilience, and adaptive capacity discussion. The message to resilience practitioners is to reject activity-based visitor numbers, trail miles and park acres to indicate community health and insist on meaningful recreation system outcome indicators.

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# Chapter 1 Introduction

This thesis was proposed to apply the theory of recreation within the conceptual framework of resilience theory to define the role of outdoor recreation in community resilience and adaptive capacity. The central hypothesis is that outdoor recreation diversity adds value and helps build community resilience and adaptive capacity. The design is meant to utilize the well-established theoretical body of work and existing operational methodologies in both disciplines. The added value of a dissertation-level study and research project was expected to be the new knowledge that emerges from the nexus between the two disciplines on the theoretical and operational levels. There are no examples in the literature or any practical evidence of any cross-disciplinary relationship between outdoor recreation and community resilience, despite increasing evidence that suggests there should be.

Today, the public value of recreation largely occurs in the intuitive realm as unrealized social and economic benefits, although a growing body of literature in economic and social benefits is claimed by the recreation discipline. Most agree that recreation and green spaces are inherently good for society. However, this inherent good has not been widely or systematically managed for in the holistic scientific process of a Recreation System. Although supporters laud the benefits of recreation to human communities, recreation has not become a meaningful indicator of community well-being or resilience.

Chapter 2 references the foundational literature of resilience theory. It explores the concepts behind building resilience and adaptive capacity and identifies the conceptual elements of resilience that relate to recreation theory. The chapter results in a summary table of key resilience elements that will be applied to recreation theory. Resilience

theory provides a theoretical framework through which recreation can potentially connect and integrate recreation system services to improvements in community well-being and resilience.

Chapter 3 references the foundational literature of recreation theory and compares three recreation models. The recreation system components are identified to further identify conceptual linkages to resilience theory. The three recreation models are discussed in detail with examples to ascertain their fit with community resilience and similar concepts of community resilience and adaptive capacity.

Chapter 4 further explores resilience and recreation theories by referencing literature in the sub-theories of community resilience and adaptive capacity and that of outdoor recreation. The conceptual connections are identified between resilience and recreation theory to choose the recreation model that most closely matches resilience theory and elements. The theoretical and operational disconnect between the two disciplines is explored. Emerging from this theoretical application is a proposed agent-based Recreation-System Community-Resilience Framework. This framework seeks to explain resilience and recreation behavior phenomena through agents interacting within community and green space settings at the neighborhood scale to produce positive and negative outcomes that feedback to the agents, community, economy and environment. Understanding the role of the Recreation System in building community resilience and adaptive-capacity provides decision-makers a significant indicator for improving quality of life and community well-being as well as avoiding negative recreation outcomes that can erode adaptive capacity for resilience.

Chapter 5 describes the research design in utilizing existing operational methodologies for community resilience and outdoor recreation as they relate to the research project in the Community Council Area neighborhoods of Anchorage, Alaska. The chapter describes the methods, constructs, variables, and measures that could be used to replicate the study. The results of both the community resilience and adaptive capacity and the outdoor recreation studies are displayed, analyzed and the results discussed and interpreted.

Chapter 6 presents the conclusion and summarizes the salient points of the theory and operationalization of the community resilience and adaptive capacity and outdoor recreation opportunity diversity constructs. The thesis and research project generally support the hypothesis that community resilience and adaptive capacity is enhanced and fostered by a diversity of outdoor recreation activities, settings, experiences and recreation system service outcomes. This level of support is backed by a linear test with statistical significance to show a predictable, but not necessarily a causal relationship.

Knowledge of place-based recreation system outcomes and their relationship to community resilience may allow recreation to more meaningfully participate in the discussions of community well-being and economic health. It would also provide the scientific information to better link public recreation and green space management to high-value actions that enhance community health, resilience and adaptive capacity. In such a manner, decision-makers would have better data on where and why certain recreation outcomes are produced and the recreation profession can better articulate the valuable recreation system services it provides to society.

# Chapter 2 Resilience Theory

## 2.1 Theoretical Basis to Resilience Theory

Holling (1973) was among the first to articulate a theoretical understanding of ecological resilience. Since then, resilience theory has expanded from a focus on ecology to coupled socio-ecological systems and more recently to urban resilience. Folke et al. (2010) state that "social-ecological resilience is about people and nature as interdependent systems" at local community and global scales. Studies of ecological resilience and the increased knowledge of human interaction with nature have spurred an enhanced understanding of joint nature-human systems behavior. Resilience theory hypothesizes that coupled socio-ecological systems are complex, nonlinear and evolving and are subject to disruptive change, uncertainty and sometimes collapse (Berkes and Folke 1998, Colding et al. 2003, Walker and Lawson 2009). Resilient systems are continually evolving as they adapt to changes in society and the environment and receive constant positive and negative feedback as to how those changes affect components of the socio-ecological system (Alessa et al. 2009, Raudsepp-Hearne et al. 2010). Resilient systems have the adaptive capacity to be flexible and learn from system feedback to make real-time adjustments to achieve a desired state of livability (Folke et al. 2003). The antithesis of a resilient and adaptive system is a vulnerable one that is subject to undesirable changes that lack the capacity to adapt, transform and retain a desired state of being (Adger et al. 2006, Gallopin 2006). Resilience and adaptive capacity are synergistic as both concepts work in unison toward the same end.

## 2.2 Understanding Resilience and Adaptive Capacity

Folke et al. (2003) argue that "building resilience and adaptive capacity in social-ecological systems requires four factors that interact across temporal and spatial scales: learning to live with change and uncertainty; nurturing diversity for reorganization and renewal; combining different types of knowledge for learning; and creating opportunity for self-reorganization toward social-ecological sustainability." Folke et al. (2002) suggest that natural and social systems behave dynamically in "non-linear ways and that social-ecological systems act as strongly coupled, integrated systems." Socio-ecological resilience is: "the amount of disturbance a system can absorb and still remain within the same state or domain; the degree to which the system is capable of self-organization and the degree to which the system can build and increase the capacity for learning and adaptation" (Carpenter et al. 2001). A resilient social-ecological system can better respond and adapt to unpredictable natural and human socio-economic changes without destroying future alternatives to provide life-sustaining ecosystem services and maintain a desired socio-economic and ecological function (Folke et al. 2002).

Holling, Gunderson, and Ludwig (2002) explain that the focus on resilience is an attempt to understand and anticipate socioeconomics, politics, and ecosystem-change dynamics and the kinds of changes that create transformation and adaptation. Holling and colleagues further suggest that any type of management that avoids socio-economic system change instead of embracing that change is inevitably not only unrealistic but introduces vulnerability.

Alessa et al. (2009) further explain that an ideal resilience system "can meet its own needs and desires within its local environment, where "local" reflects variable scalability relative to its geography surrounding a settlement, and possesses a trajectory consistent with maintaining this condition over long periods of time." Alessa and colleagues go on to demonstrate that human settlements and their subdivisions and the local and global forces that affect them are more "messy" than "neat" and thus portions of them can be a mosaic of more or less resilient and vulnerable.

## 2.3 Resilience Elements to Consider in Choosing a Recreation Framework

From the body of resilience literature, six key elements and their properties stand out to define the conceptual approach to resilience and adaptive capacity: Resilience, Adaptive Capacity, Diversity, Panarchy, Adaptive Management, and a Systems Approach. These elements throughout the body of resilience theory literature work together within a socio-ecological system approach with overlapping concepts and properties that complement one another.

The Resilience Element contains long-term, integrative, and interdisciplinary properties that act to increase the capability of a coupled social-ecological system to sustain productive capacities for life, society, and nature. Berkes and Folke (1998) state "resilience in this context is a measure of robustness and buffering capacity of the system to changing conditions." They also explain that a resilient system will transform itself and evolve with the changes to maintain a state of equilibrium and perhaps achieve thriving conditions due to its increased adaptive means to make adjustments. Chapin et al. (2011) call for a science-based initiative to assist in identifying alternatives that "enhance ecosystem resilience and human well-being."

The Adaptive Capacity Element contains flexible, dynamic, responsive, and self-organizing properties. Scheffer et al. (2000) states "The existence of institutions and networks that learn and store knowledge and experience, create flexibility in problem solving, and balance power among interest groups play an important role in adaptive capacity." Folke et al. (2002) explain that the resilience framework when combined with adaptive management increases adaptive capacity to absorb system disturbance. Adapting and evolving around change in a flexible and responsive manner allows networks of institutions to build increased capacity for dealing with problems. Adaptive systems learn to take advantage of new situations to transform system components including new governance structures (Folke et al. 2003).

The Diversity Element contains variety, redundancy, facilitation, and coping properties. It provides a mix of system components with overlapping functions that act as insurance within the coupled socio-ecological system (Folke et al. 2002). Diversity can enhance performance of institutions in that redundant functions can reduce conflicts, increase coping mechanisms for dealing with change, and create opportunities for efficiencies (Low et al. 2003). Biggs et al. (2012) maintain that systems with "high levels of diversity and redundancy tend to be more resilient" and that the less diverse a system becomes, the more vulnerable it becomes to changes that introduce less capability to develop constructive responses. Elmqvist et al. (2003) define response diversity as the range of reactions to change that contribute to resilience in order to enhance the flow of ecosystem services. They state "high response diversity provides a buffer that insures the system against the failure of management actions and policies" which is critical to maintain essential function and system stability.

Bengtsson et al. (2003) make the case for protecting biodiversity through designation of nature preserves within human communities so that they are integrated within management of the socio-ecological system instead of an island apart from society.

The Panarchy Element contains dynamic, embedded systems, and cross-scale properties. It provides an organizational view to explain the complex and dynamic interactions that occur across time and spatial scales and between nested systems to help understand the source of nonlinear change in a socio-ecological system (Gunderson and Holling 2002, Abel et al. 2006, and Gotts 2007). Holling, Gunderson, and Peterson (2002) explain panarchy as the "evolutionary nature of systems that are nested one within the other across space and time." Holling and colleagues go on to explain that panarchies differ from hierarchies because they do not operate in a "rigid, top-down approach" with highly structured paths of interaction. Socio-ecological systems and organizations flow across time and space and between levels of systems without hierarchical rules, but adapt as they learn and grow (Holling et al. (2002). Panarchy represents the dynamic connections between systems and organizations from local to global scales and the interaction within those scales over time to explain adaptive processes (Walker et al. 2006, Pritchard and Sanderson 2002). It should be noted that the adaptive cycle process of growth, collapse and reorganization described within panarchy is not applied to recreation.

The Adaptive Management Element contains collaborative, participatory, networking, decentralized and governance properties. Adaptive management is synonymous with designed experimental management in which managers can learn through incremental trial and error, as an evolutionary process (Walters 1997). Organizational processes and decisions are regularly evaluated and monitored against new knowledge and policies and

programs are adjusted accordingly (Gunderson and Holling 2002, Folke et al. 2005, Olsson et al. 2006). By "linking institutions both horizontally (across space) and vertically (across levels of organization)" we might enhance co-management arrangements in an adaptive fashion (Berkes 2002). Ostrom and Janssen (2004) and Olsson et al. (2004) suggest that understanding multi-level governance of resilience systems and how they respond and adapt to system disturbance is necessary to better cope with complex socio-ecological systems. Nelson et al. (2007) make the case that "adaptive governance" using co-management arrangements and decentralized structures is best suited for producing resilience. More integrated landscape-level approaches to learning, networking and adaptive management are required to build capacity for sustainability and stewardship (Chapin et al. 2009, Folke et al. 2011).

The Systems Approach Element contains holistic, feedback, and outcome properties. Systems refer to a holistic view and accounting of all system input, throughput and output components, the interrelationships among system components, and the system outcomes that feedback to system components (Berkes and Folke 1998, Fiksel 2006). Berkes and Folke (1998) further state that the outcomes can be negative or positive implying that a system is an all-component approach as opposed to a piecemeal framework. Fiksel (2006) further implies that the coupled socio-ecological system view is that all components of the system operate regardless and intentionally leaving out system components reduces the opportunity to analyze the interactive cause and effects of the components within the system and how they affect outcomes.

Refer to Table 1 for a summary of key elements with a comparison to its conceptual anti-thesis. These resilience theory elements will be utilized to test Recreation within Resilience Theory.

| Table 1 Key Resilience Elements and Their Conceptual Antithesis | |
|---|---|
| Element | Conceptual Antithesis |
| Resilience – dynamic nonlinear change, long-term orientation, outcome-driven, evolving, complex | Vulnerability, short-term, linear, output oriented |
| Adaptive Capacity – responsive, self-organizing, proactive, learning | Static, reactive |
| Diversity –variety, flexibility, redundancy, values diversity | Homogenous, values simplicity |
| Panarchy– dynamic, cross-scale, embedded systems | Hierarchical, rigid |
| Adaptive Management – collaboration, participatory, networks, interactive, transformative, decentralized | Command and Control, centralized, large scale |
| Systems Approach – holistic, feedbacks, desired outcomes | Component-driven, piecemeal |

# Chapter 3 Recreation Theory[1]

## 3.1 Towards an Outcome Approach to Outdoor Recreation

This chapter explores the various recreation models in which resilience elements discussed in the previous chapter will be applied to identify a conceptual match between resilience and recreation theories. The review starts with behavioral theories and concepts of recreation and the various models developed as the discipline matured from the beginnings to advanced scientific models. It then identifies the components of various models to allow for comparison with resilience theory.

## 3.2 Theoretical Basis to Outdoor Recreation

Motivation theory hypothesizes that people engage in outdoor recreation in their leisure time to satisfy needs and attain desired outcomes. Maslow's (1954) Theory of Human Motivation and Vroom's (1964) Expectancy Theory of Motivation are two key works in this area. Maslow (1954) argues that goals manifesting themselves as needs and desires are the centering principles of motivation resulting in human behavior. He describes basic human needs and a hierarchy of increasingly higher-level needs that humans seek once lower-level needs are met. Wager (1964) then describes eleven basic needs that people seek to satisfy through recreation and proposes that if we measure the needs, we could better understand why people engage in recreation activity. He argues that an increase in the number of recreation participants in an area negatively impacts the quality of the recreation experience in that area due to a decrease in personal satisfaction.

[1] Paragraphs of text and tables in Sections 3.3 and 3.4 that were originally published on-line at the University of Alaska-Anchorage, Resilience and Adaptive Management Group in December 2007 as part of this dissertation working draft were copied in whole without citation or permission of the author in "Water-based Recreation Area: Case Study of River Niger in IDAH, Nigeria" by Orga, Kolawole and Ato in the Volume 4, September 2012 Journal of Environmental Science and Resource Management.

Driver and Tocher (1970) further framed the discussion of recreation as a rewarding endeavor in which people seek higher-level outcomes through recreation that are greater than simple participation in a recreation activity. They further point out the pitfalls of providing more recreation activity opportunities without considering desired experience opportunities. Driver and Brown (1978) describe a recreation demand-needs hierarchy in terms of recreation behavior that first seeks to fulfill basic recreation activity needs, then to fulfill desires for higher recreation experience. They explain that beyond the desire to fulfill basic activity needs and higher experience needs, there are motivations and needs to realize even higher levels of recreation benefits.

Vroom (1964) argues that people are motivated to behave in a certain way based on the expectation that the resultant behavior will produce an attractive and desired outcome. Lawler (1973) applied workforce studies to expectancy theory to describe how motivations are the result of the perceived likelihood of a desired outcome. He states that, if the desirability of the outcome is low, motivation to engage in the behavior leading to the outcome will be low. He further suggests that outcomes might be either ends unto themselves or a means to additional higher-level outcomes.

Expectancy Theory also spawned the theory of Reasoned Action proposed by Ajzen and Fishbein (1980) that suggests that behavior is determined by intention to perform the behavior and that the best predictor of behavior is the readiness to act on those intentions. This theory was later revised in theory of Planned Behavior proposed by Ajzen (1991), which holds that only specific attitudes toward the behavior can be expected to predict that behavior. The Need and Expectancy theories of motivation aid in the evolution of recreation from an activity definition to a behavioral definition where recreation activities and experiences lead to even higher-level demand. Recreation Experience Preference

Scales were developed to aid in the collection of empirical evidence that recreation results in higher-level experience opportunities. The Recreation Experience Preference Scales were designed to measure the extent to which specific experiences are desired and expected by individuals choosing to engage in specific leisure activities (Driver 1977). Appendix A in Moore and Driver (2005) provides a recent description of the Recreation Experience Preference Scales.

The Benefit Outcome Approach to Leisure theory describes the evolution of recreation from just an activity to engage in, to a behavioral definition, where experiences achieve a higher-level need, then leading to attainment of even greater beneficial outcomes through participation and support of recreation and green spaces. Throughout the 1980's, many recreation experiential studies were conducted to test the reliability and validity of the Recreation Experience Preference Scales. Experiential studies also spurred interest in defining and systematically measuring the greater outcomes and motivation beyond those of recreation experiences. Driver et al. (1991) document the state of knowledge on the benefit outcomes of recreation and urge additional work to further measure the outcomes as a gain ("improved condition") or loss resulting from recreation participation and management.

Throughout the 1990's, additional experience and outcome research continued as the Benefit Outcome Approach to Leisure theory evolved. Driver and Bruns (1999) defined positive or beneficial outcomes as "improved human conditions, maintenance of desired conditions, and satisfying recreation experiences." They describe that negative or detrimental outcomes are "decreased human conditions, unwanted conditions, and dissatisfying recreation experiences." The Canadian Benefits Catalogue (1997) documents the specific studies and evidence that recreation produces benefit outcomes

and that those outcomes are attributable to recreation. Moore and Driver (2005) and Driver (2008) provide for a more recent, continually evolving Benefits Checklist of outcomes attributed to leisure.

Just as the Recreation Experience Preference Scales provided the impetus for a scientific approach to an experience-based model, the Benefits Checklist has provided the advanced scientific foundation for the Benefits Outcome Approach to assess the higher-level needs for recreation benefits beyond activity and experience motivation. The benefit outcomes have advanced and expanded the recreation theoretical framework by revealing additional recreation system components that were not considered previously.

## 3.3 Recreation Production Models

Understanding the evolution of recreation theory allows for instructive dialogue on the production process of the recreation system. Using Buckley's (1967) general systems theory, three Recreation Production Models have been developed to simulate recreation behavior and generation of recreation services. These are the Activity-Based Model (ABM), the Experience-Based Model (EBM), and the Benefits-Based Model (BBM) as adapted from Bruns et al. (2000). They describe that the Activity-Based Model (ABM) portrays a system that aims to produce basic activity opportunity outputs through on-site management of the physical and operational settings of a green space and the implementing actions of a green-space manager; the Experience-Based Model (EBM) expands on the basic ABM by considering recreation behavior to produce experience opportunity as well as activity outputs through management of social settings of green space in addition to the physical and operational or administrative settings; and the Benefits-Based Model (BBM) further expands upon the basic ABM and limited EBM by incorporating all recreation system components that: 1) target benefit outcomes as the

ultimate product of the system; 2) produce system outputs of benefit opportunities in addition to activity and experience opportunities; 3) consider off-site adjacent community settings as well as physical, operational and social settings of the green space; 4) consider the influence of a network of recreation service providers (both on-site green-space managers and community-centered service-provider businesses, non-profits, and other governmental agencies); 5) take into account negative and detrimental outcomes as well as the positive ones from the system beyond that of just green space visitors to community residents, local economy, and the regional ecological environment; and 6) consider the public value and support of green spaces not just to the on-site visitor and nearby community resident, but also of someone far away who may incur off-site benefits without ever intending to visit.

### 3.4 Comparing Recreation Production Models

An illustrative story may help in further understanding of how the different models of recreation management operate. The models are applied in terms of how people within each model would react.

A picture on the front page of the daily newspaper showed a woman figure skating on Westchester Lagoon. The city clears snow from the lagoon and hot mops a smooth skating surface. The skater was gliding across the ice, eyes closed, arms spread eagle with an angelic look of peacefulness across her face. The caption read, “I come to Westchester to relieve workday stress and enjoy the solitude and outdoor beauty.” She was expressing a satisfying on-site psychological experience and a desire for an improved mental health outcome. In ABM, agency technicians, programmers and engineers would document activities and participation rates. In advocating for activities and programs, personnel would look to expand and build-on to current activities. Imagine that ice

dancing, skate marathons, hockey games and a learn-to-skate program could be developed to facilitate the skating activity. Instead of the rustic burn barrels now offered to warm skater hands, wind resistant and more efficient masonry hearths are engineered for greater skater comfort. Much more lagoon surface area would be needed to accommodate more skaters and expanded activities. More and more people would be drawn to the attractions necessitating a need for social conflict control in some form such as a permit or reservation system to address carrying capacity. More rules and enforcement of rules become necessary. The agency draws notice and city-wide awards for increasing the numbers of skaters in the lagoon area, greater numbers of programs as well as more fee revenue earned. A few nearby residents move out of the neighborhood because of the traffic congestion and noise by late-night activities that were not there when they moved to the neighborhood.

Notice how the activity-based orientation transforms the physical setting from a fairly natural setting to one of more development. Transformed, the almost totally snow-cleared lagoon dominates a once fairly natural outdoor landscape. The social setting is transformed from one of solitude to a socially busy and comparatively crowded one. The operational setting has transformed from no regulations and occasional plowing into a very busy operation in running commercial permits, building maintenance, collecting fees, and day-to-day operations of the facilities.

What happens to outcomes? The woman skater has now been displaced as her opportunities for desired experiences and outcomes are no longer offered or managed for and she has had to find them elsewhere. The ABM does not account for experiences and outcomes and has no idea of the impacts. It now will never know, as the skater is gone and cannot be interviewed as to why she moved on. Even worse, management has

unknowingly transformed the area from natural to developed and only after employee reflection or neighborhood dissatisfaction has a clue that the lagoon has negatively changed for some. It has no idea or way to account for nearby resident impacts, as this component is not considered in the ABM.

In another scenario, had a BBM assessment been undertaken, it may have revealed that nearby residents and city skaters sought out Westchester Lagoon as one of the few areas for opportunities for solitude and skating enjoyment in a natural setting. And that 90% of visitors sought these outcomes. It would then have the baseline data to make management decisions related to the lagoon. It still may have decided to develop the lagoon, but it would have known the impacts it might have had. If they valued those experiences and outcomes, other skating areas may have been set up to manage for them. Perhaps developed skating opportunities were under-developed in the region. They will never know in ABM. Realistically, managers might have made vastly different decisions to keep the area unchanged if similar opportunities were offered nearby and in such a quantity to satisfy demand. In BBM, they might have decided to develop another more suitable neighborhood and green space setting to create the type of recreation opportunity it did under ABM and do it so that a wide diversity of skating opportunities were available to the populace.

Table 2 below compares each model by system structure of inputs, throughputs, outputs, and outcomes. Notice the evolution and progression from basic ABM, to limited EBM, to advanced BBM in terms of system components and how each model progressively incorporates the components of less complex models. The advanced BBM is a whole-systems approach that includes all components of producing recreation opportunity outputs while accounting for positive benefit outcomes and mitigating negative

consequences. In reality, all recreation system components operate regardless of the model considered. However, activity-based and experience-based managers do not assess or plan for many of these components in an explicit manner.

Table 2 System Structure Comparison of Recreation Production Models

| | System Inputs (Provider Actions) | System Throughputs (Settings) | System Output (Opportunities Produced) | System Outcomes (Outcomes Produced) |
|---|---|---|---|---|
| ABM* | Management<br>Marketing<br>Monitoring<br>Administration | Physical<br>Operational | Activity<br>Opportunities | No Outcomes are Considered |
| EBM** | Management<br>Marketing<br>Monitoring<br>Administration | Physical<br>Social<br>Operational | Activity &<br>Experience<br>Opportunities | Experiences (+/-) |
| BBM*** | Management<br>Marketing<br>Monitoring<br>Administration | Physical<br>Social<br>Operational<br>Community | Activity,<br>Experience &<br>Benefit<br>Opportunities | Experiences (+/-)<br>Personal Outcomes (+/-)<br>Social Outcomes (+/-)<br>Economic Outcomes (+/-)<br>Environmental Outcomes (+/-) |

*ABM – Activity-Based Model
**EBM - Experience-Based Model
***BBM – Benefits-Based Model

Table 3 provides another view of system components to demonstrate the inclusive and progressive nature of each model as it incorporates the components of the less complex models. The BBM transitions the recreation system from a micro sole-source provider world inside green spaces into the macro world of the greater community and society, thereby recognizing a broader context of public good. BBM makes the recreation-community linkage by including community settings and the greater community-centered network of recreation service-providers. Producing positive public benefits are critical

for community support for land allocations and funding for green spaces and recreation. Thus, implementation of the BBM is paramount to connecting the recreation system of green spaces and recreation services with the well-being of the greater community to which it is intrinsically linked.

Table 3 System Component Comparison of the Three Recreation Production Models

| Recreation System Components and Products | ABM | EBM | BBM |
|---|---|---|---|
| Recreation Visitors | * | * | * |
| Green Space Managers & Providers (on-site) | * | * | * |
| Green Space Physical Settings | * | * | * |
| Green Space Operational Settings | * | * | * |
| Recreation Activity Opportunity Outputs | * | * | * |
| Green Space Social Settings | | * | * |
| Recreation Experience Opportunity Outputs | | * | * |
| Recreation Experience Outcomes (+/-) | | * | * |
| Community Settings | | | * |
| Network of Recreation Service Providers | | | * |
| Off-site Recreation System Supporters | | | * |
| Recreation Benefit Opportunity Outputs | | | * |
| Quality of Life Outcomes (+/-) | | | * |
| Community Outcomes (+/-) | | | * |
| Economic Outcomes (+/-) | | | * |
| Environmental Outcomes (+/-) | | | * |

There are many advantages to the more advanced BBM over the basic ABM and EBM, most having to do with expanding management functions beyond activities into the benefit outcome realm. BBM revolutionizes the way recreation management actions are deployed. Actions are now constrained to only those actions that help achieve outcome-oriented goals. Two major issues such as displacement and the slide to the developed side of the setting spectrum where issues involve dissatisfying experiences and negative outcomes are thought to occur as a result of not considering the setting-dependent nature of experience and outcome attainment. If no outcome-oriented data are collected and no baseline established, there is little way of knowing how management actions affect them. The lack of outcome data assessment is a major impediment to implementing BBM.

Displacement of visitors and residents is an unintended consequence of ABM. If managers only collect data on activities and projects on-site, they cannot assess the impact of those programs on experiences or the longer-term benefit outcomes that mature off-site. Not having baseline data or the ability to analyze experience or outcome trends, one may not be aware that visitors have been displaced and have been driven elsewhere because the experiences and outcomes they prefer no longer exist. They were never managed or accounted for; therefore management does not know the impact management activities have had on outcomes.

A slide to the developed side of the physical, social and operational setting side of the spectrum is another unintended consequence of ABM. Over time, the tremendous job of our recreation technicians, programmers and engineers, transform most green spaces into more developed, crowded and regulated settings. This reduces naturalness, solitude and freedom from regulation opportunities. An ABM manager may not even recognize the transition as no experience or outcome baseline data are collected from which to analyze trends, no outcome-oriented management planning objectives are established to guide experiences or benefit outcomes, and no outcome-oriented indicators or standards are utilized to evaluate the impacts on experiences or outcomes.

Benefits-based recreation inventory would involve assessment of activity-based facilities and programs, but also include collecting baseline data on experiences and outcomes to establish a baseline for trend monitoring. The problem of inventorying just at the ABM level is that one can't do impact assessment on experiences or outcomes.

## 3.5 The Benefits Outcome Approach to Recreation

The Benefits Outcome Approach manages for enhancement of individuals, communities, economy and environment as ultimate products of producing recreation opportunities. Emphasis on producing benefit outcomes and avoiding negative outcomes allows recreation service providers to relate their diverse products to citizen quality of life, community health and well-being, economic stability, and ecological sustainability. In this manner, the public good and value of acquiring and protecting green space and providing public funding for recreation is more objectively justified. Benefit outcomes refer to life enrichment and improvements in personal, social, economic, and environmental conditions resulting from participation in and support of outdoor recreation. Benefit outcomes have been conceptualized in the Benefit Outcomes Approach to Leisure theory and operationalized in the BBM.

The BBM and its outcome-based and outcome-focused framework must be applied to all aspects of a recreation program. In addition to planning and management, this includes strategic direction, policy, budget, and training. The text, Managing to Optimize the Beneficial Outcomes of Recreation, edited by Driver (2008), provides international examples of agencies implementing the Benefit Outcome Approach. A chapter of this text was co-authored by this student to document the Bureau of Land Management's efforts to operationalize BBM. In terms of operationalizing a BBM Approach to recreation surveys, the traditional activity-based approach which had focused on collecting data only on activity and participation rates, is simply expanded to include not only activity-based information, but now collects associated information on experiences and outcomes as well as the setting attributes and conditions. A Benefit Outcome Approach to recreation planning merely extends our traditional activity-based planning and now considers the additional recreation system components of experiences and

outcomes and the setting upon which they depend. Setting conditions become planning decisions instead of prescriptions, as they are essential to achieving the experiences and outcomes. A Benefit Outcome Approach to recreation management switches the questions from 'what' recreation program actions do we manage for to 'why' implement any recreation program action. The answer is only those recreation actions that achieve the stated outcomes and setting decisions. If the action to be implemented does not achieve the stated outcomes, it is likely contrary or non-essential to achieving it. The goal is to manage for the beneficial outcomes and mitigate or avoid the negative outcomes.

To more specifically demonstrate how BBM has been operationalized in context with this dissertation research project, development of a handbook was contracted by the Bureau of Land Management for agency use in collecting outcome-based data to be utilized in planning efforts. The handbook was authored by Nickerson et al. (2005) and this student served as a technical reviewer. This work and many others (e.g., Fix 2008, Kliskey 2011) have continued to advance the science behind outcome-based data collection and the relationship between variables and components.

Nickerson et al. (2005) explains that managers and researchers have been working together for the last 25-30 years to develop and study methodologies to assess the experiences and benefits that visitors attain from recreation areas, as well as identifying the benefits that communities gain from the presence of recreation areas. Nickerson explains that the handbook has two primary purposes: 1) present effective techniques that managers can use without assistance from professional researchers; and 2) provide managers with a guidebook for contracting data collection on beneficial outcomes. The

foundation of most contemporary outcome-based surveys is documented in this handbook as well as the actual survey instrument itself. This survey has been improved upon in more recent BBM surveys (Fix 2008, Kliskey 2011) as well as others. However, the methodology remains similar in most BBM surveys.

### 3.6 Benefits-Based Model Links Recreation To the Greater Community

People ultimately seek desired experiences and quality of life when they engage in outdoor recreation on-site or in support of it off-site. Otherwise, they would seek something else to do with their leisure time. The BBM identifies the important concepts and components of the recreation system that operate to influence whether any particular recreation outcome is positive or negative. Applying the BBM to all aspects of a Recreation Program from policy to planning, from budget to management and from strategic direction to assessment, ensures that the entire program is aligned in an outcome-focused manner. Very important to the BBM process is scientific knowledge of the positive experiences and outcomes most desired by the customer, the setting attributes, and the service delivery system that most influences and determines the positive or negative nature of the engagement.

The BBM transitions the recreation system from a micro sole-source provider world inside green spaces into the macro world of the greater community and society thereby recognizing a broader context of greater public good. BBM makes the recreation-community linkage by inclusion of community settings, assessment of community needs, and engagement with the community network of recreation and tourism service providers. Citizen and community support for land allocations and funding for green spaces and green space management are critical in BBM to produce positive public benefits from recreation. Thus, implementation of the BBM is paramount to connecting

the recreation green spaces and recreation system services with that of the greater community to which it is intrinsically linked.

# Chapter 4 Resilience and Recreation Theories Connected

## 4.1 Recreation-System Community-Resilience Framework

A new framework emerges from the nexus of Resilience and Recreation Theories that reveals the potential role of outdoor recreation in building community resilience and adaptive capacity. The Recreation-System Community-Resilience Framework demonstrates the conceptual model that best fits outdoor recreation components and resilience elements.

Prior to describing the emergent Framework, a background discussion on urban or community resilience as a sub-set of resilience theory will lead into identification of the operational disconnect between recreation and resilience theories as supported in the academic literature and in agency practice. The disconnection between theory and practice instructively sets up testing of recreation theory within the resilience framework to identify the common concepts and linkages. This test results in an agent-based model that seeks to explain the Recreation-System Community-Resilience components, interactions between agents and components, embedded nested scales and thresholds in emergent properties that feedback to agents and components of the system. The result is the first known scientific effort to describe the Benefit Outcome Approach to Leisure Theory in relation to the concepts of social-ecological resilience and community resilience and adaptive capacity.

The discussion goes a step further in relating the Recreation-System Community-Resilience Framework to resilience and adaptive capacity in terms of the urban system or urban-wildland interface featuring urban green spaces and a diversity of recreation opportunities produced by an interagency network of collaborative service delivery

partners, a multi-level governance structure as interdependent, integrated and interdisciplinary teams of public-private co-managers. A new sub-concept of Recreation System Services evolves out of the established Ecosystems Services Concept that attempts to place emphasis on the social linkages rather than just an ecological lens within the coupled social-ecological system.

This passage edited by Walker (2007) belies the level of importance placed on this thesis and research design as a missing piece in the current literature and practice of both the resilience and recreation disciplines: "The United Nations estimates a global increase from the current 2.9 billion urban residents to a staggering 5.0 billion by 2030. Towards the end of this decade the world is expected to cross an unprecedented threshold, for the first time in history more people will live in urban areas than outside them. Reducing resilience increases vulnerability, exposing urban systems to greater risk of the vagaries of uncertainty and surprise. The same questions arise for urban as for regional social-ecological systems: how much and which kinds of disturbances can urban areas absorb without shifting to alternative less desirable system regime?"

## 4.2 Community Resilience and Adaptive Capacity

Magis (2007) defines community resilience and adaptive capacity as the capacity of a human community to respond to socio-economic, political, and ecological change in a manner that enhances a desired state of livability. Magis states that "a community resilience framework assumes that: a stable economy does not equate to community well-being; that a stable flow of resources is not possible and does not guarantee community stability; and that communities are complex and change sometimes drastically over time rather than remain constant." She further explains that human communities are dynamic and are constantly evolving in response to internal and external political, social,

economic, and natural drivers that communities cannot fully control and that because communities do not control all social-ecological changes, they must develop the adaptive capacity to tolerate changes in a way that maintains a desired standard of living while sustainably producing essential public goods and services. Andersson (2006) adds that the ecosystem services enjoyed from green spaces within communities and the resulting increase in human well-being requires that ecological functions and ecosystem services be understood so urban development is better informed.

### 4.3 The Resilience Practitioners Disconnect with Recreation Practitioners

Currently, the cross-disciplinary relationship between outdoor recreation and community resilience has not been identified in the literature, despite a growing body of evidence suggesting that recreation contributes to a community's health and well-being.

The resilience literature identifies the green space component of a community almost exclusively in the context of ecological resilience and ecosystem services. The discussion has been framed in terms of ecosystem services that equate to only the economic and environmental outcomes of recreation but not to the psychological, physiological, or social outcomes. This confirms the views from an ecological angle and provides a look on just part of resilience theory. A most promising journal article, by Barthel et al. (2005) on the management of a urban cultural landscape in Sweden comes very close to the subject of the outcome linkage between recreation and resilience as it identifies the processes of a social inventory, recreation landscape, recreation services associated with providers, and recreational green space. However, it addresses these elements in the context of ecological systems, thus missing the recreation outcome connection to the social side of the social-ecological system. It considers only the activity-based and output opportunities of the recreation system.

The Millennium Ecosystem Assessment (2005) recognizes recreation and ecotourism as part of ecosystem services and especially encouraging is the recognition of the role of recreation setting character. However, the model the Millennium Project appears to have utilized for recreation is the Activity-based Model as it describes only the recreation use component. In its description of sense of place and aesthetic value it does start to touch upon the outcome values associated with outdoor recreation. This description makes progress towards the Benefit-Based Model in recognizing that recreation or elements associated with recreation have connections to social-ecological resilience, but falls short of fully recognizing the connection between recreation system outcomes and social-ecological resilience.

Community practitioners from Health and Human Service Departments at the national, state, county, and municipal levels have not included beneficial outcomes attributable to outdoor recreation as a meaningful indicator of community resilience. The lack of evidence linking resilience and recreation benefit outcomes reflect the lack of both previous research and widespread utilization of an appropriate conceptual framework. The gap in understanding between practitioners in recreation and community resilience is illustrated in Gibbs and Brown (2000). They report that many state, county and community programs seek to provide community indicator systems for developing strategies to understand community viability, health, and social functioning. None of the reported state, county, and community-based programs list any indicators of recreation experience or benefit outcomes. A few governmental entities identify activity-based outputs in terms of numbers of participants in recreation programs, numbers of miles of recreation trails, and number of acres of open space. This activity-based approach is similar to the incomplete Activity-based Model and will yield only trends in quantitative recreation data rather than qualitative data to help measure community resilience.

Anchorage, Alaska is known internationally for its expansive parks, open space and trails. However, none of its indicators of community health relate to recreation system outcomes. Recreation is addressed as a subset of other indicators but only as activity-based acres of parks and miles of trail. No beneficial outcome or recreation system services are recognized.

Thus, neither resilience practitioners nor the resilience theory literature recognizes recreation as a whole-system generator of social outcomes involving community resilience and adaptive capacity.

### 4.4 The Recreation Practitioner Disconnect with Resilience Practitioners

On the recreation side, the recreation literature, namely Marans and Mohai (1991), Allen (1991), Anderson et al. (2008) identify many of the recreation system outcomes listed in the Benefits Checklist as indicators or measures of recreation and green space benefits for community health. These authors join many of their colleagues in agreeing that recreation results in greater community health and resilience. Their studies are even founded in the Benefits Outcome Approach to Leisure Theory. However, due to the lack of a widespread outcome application of Benefits-based Model in recreation management practice, the recreation profession remains disconnected in theory as well as application and unable to provide meaningful outcome data as an indicator or measure of community resilience, health and well-being. If universal knowledge of recreation beneficial outcomes were available, community-resilient practitioners might prefer this quality-of-life outcome data to activity output data for tracking community health and well-being. Gray and Greben (1974) found that a prevailing activity-centered approach is unsatisfactory and the activity-based approach meant the profession was focused on supply and facility management. Understanding the relationship and role of the

recreation system in community resilience provides decision-makers with outcome-oriented indicators to help achieve the goals of sustainable and resilient human-ecological communities.

## 4.5 The Conceptual Match and Fit between Recreation and Resilience

In applying resilience concepts to recreation, we readily observe that recreation activities, settings, experiences and outcomes change temporally and spatially among all classes of visitors, residents, and green spaces. Similarly, recreation needs, desires and demands of the public can change the system and this interaction may be complex. Results have been difficult to predict. Undesirable effects include displacing visitors as a result of failure to meet their basic and higher-level benefit outcome needs and transforming the distinctive and unique character of green spaces so they no longer produce highly valued outcomes or the ones desired at that time. Reversing or restoring desirable benefit outcomes can be expensive and difficult. The adaptive capacity to respond to change in recreation needs and behavior is critical to maintaining the valuable function of benefit outcomes or recreation system services produced by the recreation system. The loss of resilience to absorb certain and unpredictable change make the recreation system vulnerable to losing the capacity to generate highly valuable recreation services such as activity, experience and benefits output opportunities and resulting benefit outcomes to quality of life, society, economy, and environment.

The beneficial outcome approach like the resilience approach involves an interdisciplinary framework that integrates psychological, sociological, economic and ecological disciplines. It also considers the cross-scale nesting of green spaces embedded within a community and the community embedded in larger regional green spaces and even larger social-ecological systems. It allows for adaptive management in the baseline

collection of all system-component data and monitoring of outcome-focused objectives to adjust to temporal changes in recreation needs and behavior within the recreation- and community-setting context. Focus on the neighborhood scale allows for scaling up to citywide and regional geographic scales. This approach features a collaborative network of recreation service providers and organizations that affect and are affected by green space settings management and the outcomes produced.

Table 4 demonstrates the conceptual match and best fit between resilience elements in comparison with the three Recreation Production Models. Resilience and the Recreation Benefits-based model each rely on a holistic systems approach that is interdisciplinary, cross-scale, proactive, outcome-oriented, functionally directed, concerned with long-term quality services, non-linear, continually evolving, and facilitating adaptive management and a collaborative network of stakeholders.

Table 4 Resilience Element Comparison to the Three Recreation Models

| ELEMENTS | RESILIENCE THEORY | ABM* | EBM** | BBM*** |
|---|---|---|---|---|
| Resilience Element | Yes | No | No | Yes |
| Adaptive Capacity | Yes | No | Limited | Yes |
| Diversity | Yes | Limited | Limited | Yes |
| Panarchy | Yes | No | No | Yes |
| Adaptive Management | Yes | Limited | Limited | Yes |
| Systems Approach | Yes | No | No | Yes |

* ABM – Activity-Based Model
** EBM – Experience-Based Model
*** BBM – Benefits-Based Model

## 4.6 The Recreation-System Community-Resilience Framework Emerges

The result of applying the key Resilience Elements to the Recreation BBM within the framework of resilience is a new Recreation-System Community-Resilience Framework. Now, recreation can be explained with a resilience lens in order to apply those resilience

elements that have been shown through case study and scenario development to lead to a more sustainable and resilient social-ecological system and more resilient communities.

The Recreation-System Community-Resilience Framework in Figure 1 identifies the theoretical phenomena and system components linking social-ecological community resilience and recreation. Much like Ecosystem Services are to resilience, Recreation System Services are the public values and outcomes realized in the production of recreation output opportunities and the emergent benefit outcomes. Utilizing a resilience framework, the recreation management paradigm is transformed from an activity-based sole-source provider of on-site recreation activities, programs, projects, and facilities that treat itself as an island unto itself into an integrated and functional component of the larger community.

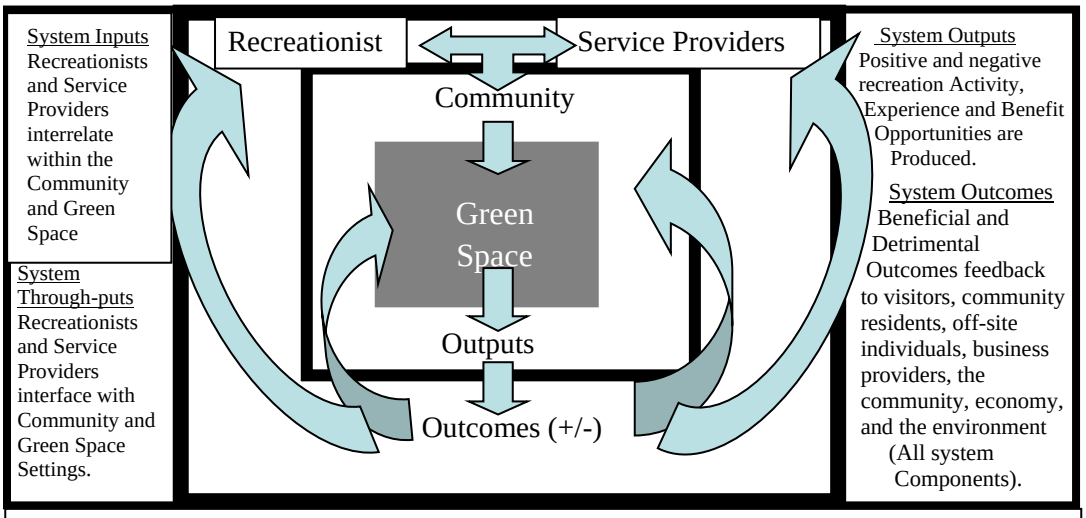



Figure 1 Recreation-System Community-Resilience Framework

The recreation system is as an embedded subsystem of the greater social-ecological system per concepts introduced in Panarchy. The recreation system consists of green spaces nested within community systems nested within regional and even larger social-ecological systems. Green spaces can be defined broadly as undeveloped open space, forests, deserts, rivers, lakes or ocean or more specifically as designated parks, trails,

wilderness, and greenway corridors. This cross-scale framework traces the interactions of recreation agents through the community and green space settings interface and their interactions with the recreation service provider network and various governance levels from local to national to produce recreation output opportunities and those outputs realized for human benefit, the recreation service outcomes.

The Recreation-System Community-Resilience Framework more specifically reflects the flow of recreation agents (visitors, residents and off-site remote supporters) and their interaction with the network of recreation service providers (green space managers, commercial business, governmental entities, hospitality services, non-government organizations, etc.) operating outside and within the community and green space. Recreationists and service providers interface with community settings (infrastructure, residential and commercial property, hotels, restaurants, sporting goods stores, etc.) and green space settings (physical, operational, and social). The interaction produces immediate and on-site activity, experience, and benefit output opportunities and results in longer-lasting latent personal, social, economic, and ecological outcomes or recreation system services (positive and negative) that emerge and feedback to agents, service provider network, community, economy and environment at local neighborhood, citywide, regional, and more global scales. Agents self-select themselves in and out of green spaces depending on the desired settings and outcomes they are seeking to attain or avoid at any particular time. A varied and diverse array of local and regional activities, experiences and positive outcomes is assumed to build higher levels of resilience as it offers greater redundancy and opportunity for agents to match their desired outcomes with green spaces that are managed for preferred settings and outcomes designed to attain those favored outcomes.

The entire network of recreation service providers within and outside the green space collaboratively plan, manage, monitor and market for positive outcomes for visitors, residents, community, economy and ecological environment. They also recognize the negative outcomes emerging from the system and cooperatively move to mitigate and avoid their detrimental effects. The green space management plan explicitly states the outcome-focused management objectives and stipulates the settings character and condition indicators and standards of the green space and applicable community settings as co-management decisions to facilitate benefit outcome attainment.

## 4.7 Recreation System Services Bridge the Recreation-Resilience Gap

The theory and concepts of resilience had not previously been applied to outdoor recreation. The Recreation Benefits-Based Model enables communities to evaluate the positive and negative outcomes produced by the recreation system on quality of life for citizens, vibrant and livable communities, stable local economies and sustainable environments. Recreation System Services are the public values realized in the production of BBM recreation opportunities. Managing for benefit outcomes helps communities build adaptive capacity for resilience, reduce vulnerability to inevitable social and ecological changes, and sustain viable options for a desired future.

Emerging from the application is the Recreation-System Community-Resilience Framework. This framework seeks to explain resilience and recreation behavior phenomena through agents interacting within community and green-space settings at the neighborhood scale to produce positive and negative outcomes that feedback to the agents, community, economy, and environment.

Application of the Benefits Outcome Approach to Leisure through the use of the Benefits-Based Model (BBM) in the context of the theory and concepts of community resilience bridges the theoretical gap between the community and the recreation system. The BBM provides a best fit with community resilience theory and an effective method for the recreation profession to be recognized as an essential public service, especially during periods of rapid social, political, and/or environmental change such as the times when recreation system services are most vulnerable to loss of funding. Community decision-makers then gain an important suite of indicators of community resilience, health and well-being, which to date, has not been taken into account when measuring community health, well-being or resilience.

This application of resilience concepts to outdoor recreation is not only new, but also provides a framework for including urban outdoor settings in recreation research which has usually focused on vast expanses of state and federal lands or on urban green spaces as isolated entities apart from communities. Large federal tracts in the U.S. include Bureau of Land Management Public Lands, Forest Service National Forests, Fish and Wildlife Service National Wildlife Refuges, and Park Service National Parks.

If managed for community resilience, the recreation system can produce increased quality of life for both visitors and residents and add value to communities and society, diversify local economies, and sustain ecological environments at multiple scales. Proactive benefit outcome management of the recreation system will enhance, improve, and build community resilience and adaptive capacity to respond to inevitable social-ecological change to maintain a community in a desired state of livability.

Framing the discussion of recreation in terms of Recreation System Services on par with Ecosystem Services may break the activity-based approach and thinking of recreation as only use, access, and participation but instead as outcomes that add value to an individual, community, economy, and environment.

# Chapter 5 Research Design and Analysis

## 5.1 Background

Previous chapters revealed the theoretical nexus between outdoor recreation and community resilience and adaptive capacity. The examination culminated in the identification of the Recreation BBM as the best fit to relate community resilience and adaptive capacity. The development of the Recreation-System Community-Resilience Framework further illustrates how components of the recreation system and its outcomes conceptually feedback to community and recreation components. The framework model simplifies reality, but identifies how components interface and agents interrelate to produce recreation system outcomes that either add to or subtract from community resilience and adaptive capacity. BBM is recreation's only theoretical and technical bridge to community resilience and adaptive capacity.

This chapter takes the discussion from the conceptual testing of recreation theory within resilience theory into operational testing of the two disciplines. The procedures to operationalize testing of recreation diversity and community resilience include: 1) Utilizing the University of Alaska-Anchorage Justice Center's 2005 Anchorage Community Survey (ACS) database to construct a Community Resilience and Adaptive Capacity Index to identify the resilience level of each CCA neighborhood in the study area from the social cohesion and trust, informal social control and social participation variables; and 2) Completing a Recreation Survey within the study area to measure recreation diversity through the recreation diversity variables of settings (parks), activities, experiences, and outcomes to construct a Recreation Diversity Index to determine the recreation diversity level of each CCA. The Index scores of recreation

diversity and community resilience from each CCA can then be compared to determine their interrelationship.

The research design began with the following questions:

1) How do the values of community resilience relate to recreation outcomes in a recreation space and how can they be mapped? (What does the social-ecological space look like?)
2) How do these values and outcomes correlate with specific biophysical and social spaces and how consistent are they across diverse spaces?
3) How do recreation benefit outcomes contribute to a community's adaptive capacity and coping mechanisms?
4) What are the drivers of community resilience as derived from recreational spaces that can be identified, quantified and modeled?
5) How do community residents adapt to changes in recreation place outcomes and settings?
6) How resilient are community residents in meeting their recreation outcome preferences?
7) How do benefit outcomes contribute to a community's adaptive capacity?

The research hypothesis is that greater diversity in recreation opportunities (setting, activities, experiences, and outcomes) fosters greater community resilience and adaptive capacity. The null hypothesis is that there is no association between recreation and community resilience and adaptive capacity.

## 5.2 Research Methodology

The basic research design, initial mockup of assessment instruments, meta-data documentation, pilot testing and final reports were completed in-house utilizing guidance from the Graduate Committee. Specialized experience was sought from the Justice Center for computerized setup and coding of the recreation survey. Assistance with GIS mapping was sought from the University of Alaska-Anchorage Resilience and Management Group.

The aim of the Recreation Survey is to replicate the research methodology of the ACS. The Recreation Survey was similar to the ACS in that it utilized a phone survey, segmented by CCA neighborhoods with a target sample size of 100 samples per neighborhood. The phone survey method was selected to meet the high response rate need, low non-response bias, lower data collection time and cost, low interview bias, and to collect a small amount of data from a large number of dispersed respondents. A random sampling technique of the telephone book was ordered from a company that segmented samples from census tract data. Census districts were geocoded back to the Anchorage CCA boundaries to define neighborhoods.

The sampling frame was 18 years or older and head of household or willing household resident over 18. The study population was the Municipality of Anchorage for the ACS while the Recreation Survey was confined to the Anchorage Bowl neighborhoods.

Specific design element targets included an interview time of 10 minutes per phone interview and a 3-month time frame in September, October, and November. Each dialing station could yield 3.3 completed phone interviews per hour, about 10 interviews per

weeknight (3 hours per night), about 50 interviews per week, times 4 dialing stations yielding about 200 interviews per week.

The Justice Center allowed use of their facility, workstations, computers and phone survey software for the study. Campus advertisements and temporary hiring services were utilized to hire phone surveyors to staff four Justice Center Workstations housed with the Win-Cati system (a computer software system where answers via phone are recorded by computer into a database). Phone surveyors were interviewed, selected, scheduled, and supervised by the Project Leader, but were hired through the Justice Center Front Office to establish the hiring and pay procedures.

The Project Leader prepared training notebooks with a hard copy of the survey, city recreation and park maps, summary and purpose of project, and computerized source lists for quick computer coding reference. Pre- and post-coding of the phone survey was built into the computer-based survey. The Project Leader and Justice Center provided on-site oversight, monitoring, and random verification of correct procedures and validity of survey process. Randomly selected database spreadsheets were produced and reviewed by the Project Lead and Justice Center Lead to check phone surveyor performance and completion of data in order to verify or correct performance.

One challenge to overcome was the lack of consensus definitions for the two main constructs of this thesis, Outdoor Recreation Opportunity Diversity and Community Resilience and Adaptive Capacity. In many works, multiple terms or groups of terms are utilized to describe these constructs with the same meaning. For clarification, the Recreation Construct has also been known as Benefits, Benefits-Based Management, Benefits-Based Method, Benefits-Based Model, Benefits-Based Approach, Outcome-

Focused Management and Outcome-Focused Approach. The Community Resilience and Adaptive Capacity Construct have been referred to as Community Health, Community Well-Being, and Local Community Capacity. With these various terms in mind, this text will make an attempt to refer to these constructs in a consistent manner.

The theoretical and operational disconnect between outdoor recreation and community resilience is also illustrated in the ACS. The intuitive connection exists as the survey does include a recreation measure. However, just as in previous research and community indicator projects, the measures are activity-based with little linkage with recreations true social value as outcomes to improve the human condition. Again, the lack of a widespread BBM approach to recreation has made the discipline nearly invisible to community resilience theorists, professionals, and practitioners. They simply have not included outdoor recreation outcomes or recreation system service outcomes as a meaningful indicator of community resilience, adaptive capacity, health and well-being as a direct result of the information not being generated and made readily available.

The Justice Center operationalized and defined community resilience and adaptive capacity for the Municipality of Anchorage, Alaska. It should be recognized that the Justice Center efforts with the ACS project presented the opportunity for the Recreation Research Project to examine outdoor recreation in context with community resilience and adaptive capacity. The ACS (Myrstol and Langworthy 2005) is part of an "ongoing research effort developed to: 1) systematically collect information that can be used to construct comprehensive descriptions of the social dynamics of Anchorage communities; and 2) build a multi-disciplinary research platform for use by researchers, policymakers, and practitioners interested in the investigation of community contexts". They further state that the ACS is designed to "contribute valuable information about the nature and

quality of social life within the network of communities forming the municipality of Anchorage and to make information accessible so that conversations about the health and well-being of Anchorage may become more completely informed."

The ACS defines Community Resilience and Adaptive Capacity as "local community capacity". Community Resilience and Adaptive Capacity "… is central to the evolution of strategies for strengthening communities. Hallmarks of localized community capacity include: social cohesion and trust; capacity for informal social control; and active participation in local social institutions by residents. Collectively, these characteristics are known as social capital, and are thought to be important elements in assessing the strength of community. The argument is that communities characterized by higher levels of cohesion and trust, community-level social controls, and institutional participation will be more resilient than communities lacking such traits." (Myrstol and Langworthy 2005).

The three variables utilized to measure Community Resilience and Adaptive Capacity each have a number of survey questions to measure the variable. The Social Cohesion and Trust variable contains five measures. The Informal Social Control variable contains five measures. The Social Participation variable contains six measures. The full questionnaire is located in the appendices of the Anchorage Community Survey 2005: Sourcebook (Myrstol and Langworthy 2005). Table 5 identifies the three variables, their associated survey questions and the answer key.

The Recreation Survey replicates the survey methodology and measures the recreation dimensions featured in the benefits-based model. A Manager's Guide to Gathering and Using Visitor and Community Benefits Data To Manage Outdoor Recreation Areas by

| Table 5 Variables and Measures of Community Resilience and Adaptive Capacity | | | |
|---|---|---|---|
| Variable | Variable Name | Measure | Answer Key |
| Social Cohesion & Trust | LCCAP_ 1-5 | People in your neighborhood can be trusted.<br>People in your neighborhood generally don't get along with each other.<br>People in your neighborhood do not share the same values.<br>People in your neighborhood are willing to help their neighbors.<br>Yours is a close-knit neighborhood. | Strongly agree, Agree, Neither agree nor disagree, Disagree, or Strongly disagree. |
| Informal Social Control | LCCAP_ 6-10 | One or more of your neighbors could be counted on to intervene if children were spray-painting graffiti on a local building.<br>One or more of your neighbors could be counted on to intervene if children were showing disrespect to an adult.<br>One or more of your neighbors could be counted on to intervene if the fire station closest to their home was threatened with budget cuts.<br>One or more of your neighbors could be counted on to intervene if a fight broke out in front of their house.<br>One or more of your neighbors could be counted on to intervene if children were skipping school and hanging out on a neighborhood street corner. | Strongly agree, Agree, Neither agree nor disagree, Disagree, or Strongly disagree |
| Social Participation | LCCAP_ 11-16 | Do you or any household members belong to a church, synagogue, mosque or other religious organization?<br>Do you or any household members belong to a local political organization?<br>Do you or any household members belong to a block group, tenant association or community council?<br>Do you or any household members belong to a business or civic group like the Chamber of Commerce, Rotary Club, or Elks or Moose lodges?<br>Do you or any household members belong to an ethnic or nationality club in Anchorage?<br>Do you or any household members belong to some sort of neighborhood watch group? | Yes or No |

Nickerson et al. (2005) outlines the BBM methodology. Moore and Driver (2005) define Outdoor Recreation as "engagement that results from recreation activities that occur in and depend on the natural environment. They state that outcomes that ultimately result from a recreation engagement are defined as either a positive or negative outcome that constitutes either (a) improved change in condition or a change in a condition or state that is viewed as more desirable than a previous existing condition or state; (b) the

maintenance of a desired condition and thereby prevention of an unwanted condition from occurring, prevention of an undesired condition from becoming worse, or reduction of the unwanted impacts of an existing undesired condition; or (c) the realization of a satisfying recreation experience." Types of outcomes are generally categorized into personal/psychological/physiological, social/community, economic and environmental/ecological. The BBM is a recreation and resource planning and management tool used by managers and their collaborating partners to manage for a diversity of beneficial outcomes.

Four variables are utilized to measure Outdoor Recreation in BBM: Recreation Activities; Recreation Experiences; Recreation Settings; and Recreation Outcomes. The Recreation Activity variable is measured in this research by a list of the most likely recreation activities to be found in Anchorage and has an open-ended response for any activity not listed. The Recreation Experience variable is measured by eight selected categories in the Recreation Experience Preference Scales that were chosen to be most likely to be selected by respondents based on the researcher's local knowledge of recreation behavior in Anchorage. The Recreation Setting variable is measured not on the micro-scale biophysical, social, and operations recreation settings found in most site-specific level BBM surveys, but instead based on the neighborhood scale by a list of parks, trails and other outdoor recreation areas. The Recreation Outcomes variable is measured by 10 items from psychological/personal dimension of the Benefits Checklist that were judged by the researcher to be most likely selected by respondents in Anchorage. See Table 6 for the variables, measures, and answer key utilized in the Recreation Survey.

| Table 6 Variables and Measures of Outdoor Recreation Opportunity Diversity | | | |
|---|---|---|---|
| Variable | Variable Name | Measure | Answer Key |
| Recreation Setting | RecPlace_1 | What is the closest park or trail to where you live? | List of Hundreds of Parks on the Anchorage Trails and Parks Map Brochure |
| Recreation Activity | RecAct_1 | When you visit [RecPlace_1] what recreation activity do you do most often? | List of 70 Summer Recreation Activities |
| Recreation Experience | RecExp_1 | When you visit [RecPlace_1 to RecAct_1], what type of recreation experience from the list below do you most often seek? | 1.Enjoying being outdoors<br>2.Teaching or leading others<br>3. Seeking solitude and tranquility<br>4. Meeting and socializing with others<br>5. Being with family or friends<br>6. Testing your abilities, skills or equipment<br>7. Getting physical exercise<br>8. Playing or watching a team sport or group |
| Recreation Outcome | RecBen_1 | Which one personal benefit from the list below do you get most as a result of [RecAct_1], while [RexExp_1], in [RecPlace_1]? | 1. Improved physical fitness and health<br>2. Improved mental well-being<br>3. Improved skill for outdoor enjoyment<br>4. Greater sensitivity of outdoor aesthetics<br>5. Enhanced awareness and understanding of nature<br>6. Greater sense of adventure<br>7. Greater awareness that this community is a special place<br>8. Improved opportunity to view wildlife close-up<br>9. Greater freedom from urban living<br>10. Greater cultivation of a stewardship ethic |

Most BBM surveys are implemented utilizing a personal interview with mail-back questionnaire on-site at the local setting scale. In customizing the BBM survey for the Community-wide neighborhood scale a number of modifications were called for. First, on-site setting assessment and recall of this site specific information at the bio-physical, social and administrative local scale is problematic. This was modified in the Recreation Survey where settings are described by Park area instead of settings of a park. Respondents were asked specifically about their last visit to their closest neighborhood park so that a neighborhood-by-neighborhood profile of parks and their associated

activities, experiences and outcomes would result. This was to ensure adequate description of the diversity of recreation opportunities within each Community Council Area neighborhood. The issue with asking what their last visit to [any] park or to their favorite park was that it might result in a very detailed profile of recreation diversity for a few popular heavily visited parks but not result in a neighborhood profile of recreation diversity community-wide that would reveal a relationship with neighborhood specific resilience and adaptive capacity.

Survey pre-testing showed that the length and complexity of asking outcome realization of all four outcome dimensions (i.e., individual, social, economic, and environmental) was not practical at the neighborhood level and through a phone survey medium. A decision was made to test only for one of the four outcome dimensions (i.e., individual). The level of complexity for social, economic and environmental outcomes on the phone pre-test caused respondents in most cases stop the interview.

The recreation experience variable was simplified to measure eight categories of the Recreation Experience Preference Scales rather than attempt to measure recreation experiences at the item level due to the 100 plus number of possible selections. The eight general categories were selected to cover a wide variety of experiences that would differentiate between experiences and allow profiling of diversity.

Figure 2 displays the construct and variable relationships between Community Resilience and Adaptive Capacity and Outdoor Recreation Opportunity Diversity. The Community and Adaptive Capacity Construct is measured by the social cohesion and trust, informal social control, and social participation variables. The Outdoor Recreation Opportunity

Diversity Construct is measured by the recreation setting, recreation activity, recreation experience and recreation outcome variables.

To prepare the Community Resilience and Recreation databases for cross-analysis, a Community Resilience and Adaptive Capacity Index was developed as represented by the Social Cohesion and Trust, Informal Social Control, and Social Participation variables.

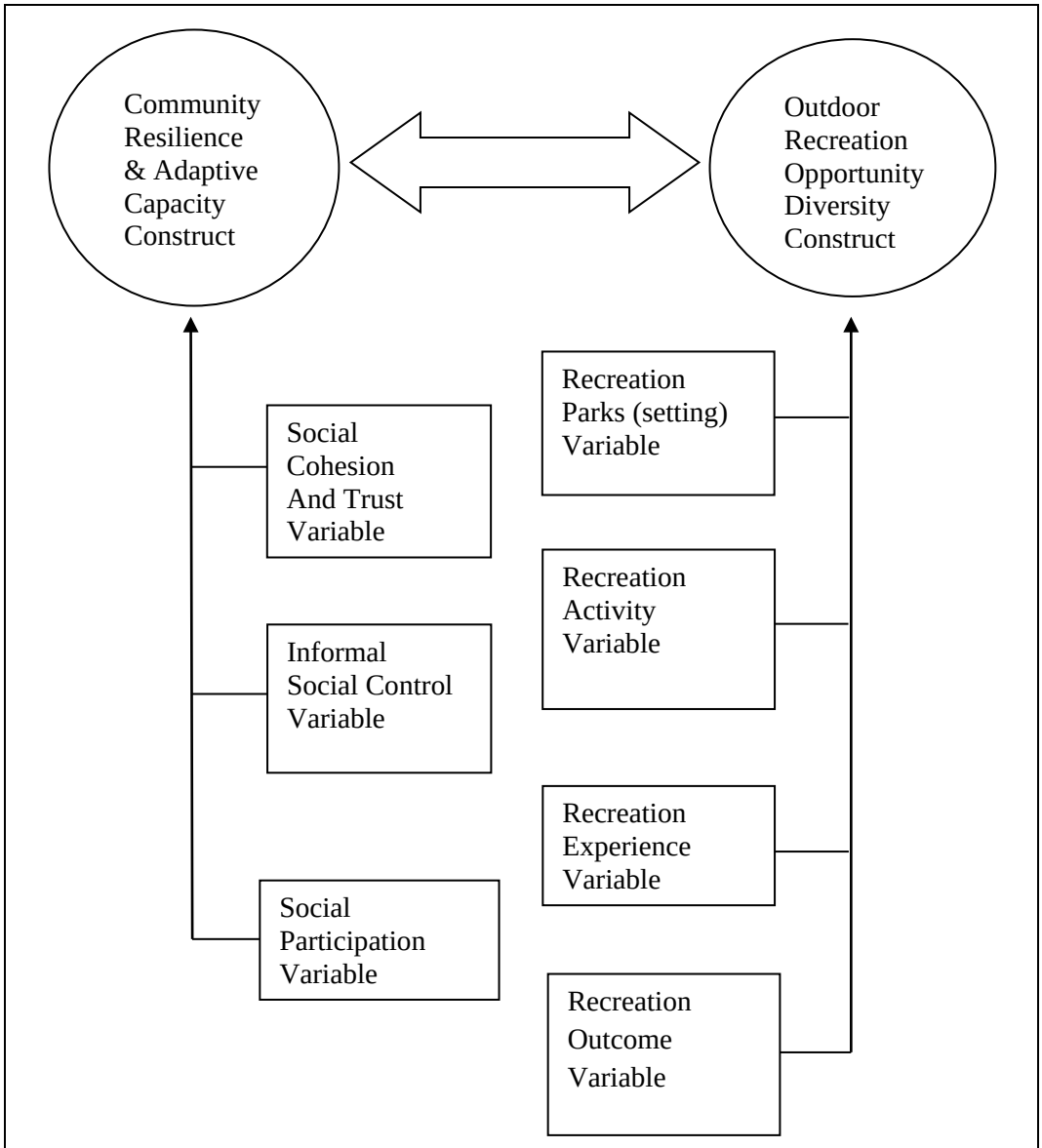



Figure 2 Construct and Variable Design for Statistical Analysis

Each measure in Table 5 was summed for each respondent according to the answer key as scored by: strongly disagree = 1; disagree = 2; neither agree or disagree = 3; agree = 4; and strongly agree = 5. Negatively worded questions were reversed scored. The Community Resilience and Adaptive Capacity Index Mean was then calculated for each CCA as an average for all respondents in that CCA. The Community Resilience and Adaptive Capacity Index Mean ranking of the 28 CCA's is displayed in Table 7.

Table 7 Community Resilience & Adaptive Capacity Index

| Rank | Community Council Area Neighborhood | Index Mean | Number of Surveys | Percent of Total Surveys |
|---|---|---|---|---|
| 1 | Basher | 44.16 | 5 | .3 |
| 2 | Glen Alps | 42.00 | 3 | .1 |
| 3 | Rabbit Creek | 41.86 | 115 | 4.8 |
| 4 | Mid-Hillside | 41.56 | 115 | 4.8 |
| 5 | Huffman/O'Malley | 41.52 | 119 | 5.0 |
| 6 | Hillside East | 41.32 | 53 | 2.2 |
| 7 | Bayshore/Klatt | 41.31 | 93 | 3.9 |
| 8 | Old Seward/Oceanview | 40.79 | 100 | 4.2 |
| 9 | Turnagain | 40.69 | 82 | 3.4 |
| 10 | Scenic Foothills | 40.35 | 88 | 3.7 |
| 11 | South Addition | 40.25 | 100 | 4.2 |
| 12 | Tudor Area | 40.24 | 50 | 2.1 |
| 13 | Government Hill | 40.19 | 26 | 1.1 |
| 14 | Sand Lake | 40.11 | 105 | 4.4 |
| 15 | Airport Heights | 39.83 | 100 | 4.2 |
| 16 | Rogers Park | 39.78 | 102 | 4.3 |
| 17 | Bear Valley | 39.44 | 9 | .4 |
| 18 | Abbott Loop | 39.29 | 72 | 3.0 |
| 19 | Northeast | 38.31 | 72 | 3.0 |
| 20 | North Star | 38.29 | 68 | 2.9 |
| 21 | Campbell Park | 38.17 | 74 | 3.1 |
| 22 | Taku/Campbell | 37.85 | 98 | 4.1 |
| 23 | University Area | 37.83 | 78 | 3.3 |
| 24 | Downtown | 37.41 | 12 | .5 |
| 25 | Russian Jack Park | 37.37 | 64 | 2.7 |
| 26 | Spenard | 37.35 | 68 | 2.9 |
| 27 | Mountain View | 36.80 | 10 | .5 |
| 28 | Fairview | 35.14 | 61 | 2.6 |

To prepare the Recreation Survey database for comparative analysis with the community resilience database, an Outdoor Recreation Diversity Index was developed by frequency testing for each distinctive recreation opportunity represented by the combined park-activity-experience-outcome chain for each respondent in each CCA. Each unique chained opportunity was counted as one in the frequency test. For example, a unique or distinctive chained opportunity would be Kincaid Park-Hiking-Being with Family or Friends-Greater Cultivation of a Stewardship Ethic. If the identical chained opportunity were repeated for two or more respondents in a particular CCA, it only counted as a frequency of one in the diversity construct. A Diversity Frequency Score was calculated for each CCA, which represents the total number of distinct chained park-activity-experience-outcome opportunities in each CCA. Then, a Diversity Index Score was developed to control for completed survey bias where some CCA's with high numbers of completed surveys had more chance for a higher level of frequency and thus, recreation diversity. The Diversity Index Score was calculated for each CCA by dividing that CCA's Frequency Score by the Number of Surveys. The Outdoor Recreation Opportunity Diversity Index ranking of the 28 CCA's in the Anchorage Bowl is displayed in Table 8.

Recreation opportunity diversity in the four levels of recreation demand – activities, settings, experiences, and outcomes was the chosen method to represent recreation in the BBM holistic process. The BBM manager seeks to optimize benefit outcomes and provide a variety of chained recreation opportunities as a hedge towards resilience and insurance against vulnerability. Just as biological diversity seeks to enhance resilience to secure production of essential ecosystem services (Elmqvist et al. 2003), recreation

diversity seeks to enhance community resilience and adaptive capacity to secure production of essential recreation system service outcome benefits.

In an attempt to reduce low sample bias, Community Resilience scores with Number of Surveys fewer than 5 as well as Recreation Diversity Frequency Scores under 10 were eliminated from further analysis. This removed Basher, Glen Alps, Bear Valley, Mid-Hillside, Tudor and North Star CCA's from the statistical analysis.

Table 8 Outdoor Recreation Opportunity Diversity Index Ranking by Community Council Area

| Rank | Community Council Area Neighborhood | Diversity Frequency Score | Number of Surveys | Percent of Total Surveys | Diversity Index Score |
|---|---|---|---|---|---|
| 1 | Turnagain | 77 | 89 | 4.4 | 86.5 |
| 2 | Old Seward/Oceanview | 19 | 22 | 1.1 | 86.4 |
| 3 | University Area | 28 | 33 | 1.6 | 84.8 |
| 4 | Airport Heights | 25 | 30 | 1.5 | 83.3 |
| 5 | Downtown | 19 | 23 | 1.1 | 82.6 |
| 6 | South Addition | 57 | 70 | 3.5 | 81.4 |
| 7 | Government Hill | 16 | 20 | 1.0 | 80.0 |
| 8 | Abbott Loop | 161 | 205 | 10.1 | 78.5 |
| 9 | Scenic Foothills | 81 | 104 | 5.1 | 77.9 |
| 10 | Sand Lake | 121 | 158 | 7.8 | 76.6 |
| 11 | Campbell Park | 82 | 107 | 5.3 | 76.6 |
| 12 | Rabbit Creek | 27 | 36 | 1.8 | 75.0 |
| 13 | Bayshore/Klatt | 21 | 28 | 1.4 | 75.0 |
| 14 | Hillside East | 15 | 20 | 1.0 | 75.0 |
| 15 | Taku/Campbell | 32 | 43 | 2.1 | 74.4 |
| 16 | Northeast | 82 | 114 | 5.6 | 71.9 |
| 17 | Huffman/O'Malley | 23 | 32 | 1.6 | 71.9 |
| 18 | Russian Jack Park | 100 | 144 | 7.1 | 69.4 |
| 19 | Rogers Park | 17 | 25 | 1.2 | 68.0 |
| 20 | Fairview | 10 | 15 | .7 | 66.7 |
| 21 | Spenard | 40 | 60 | 3.0 | 66.7 |
| 22 | Mountain View | 13 | 24 | 1.2 | 54.2 |

## 5.3 Research Results

The design of the research attempts to isolate the outdoor recreation opportunity diversity construct as a potential indicator and predictor of community resilience and adaptive capacity. Descriptive, Linear, and Geospatial analyses are employed in an attempt to delineate a predictive relationship. The step-by-step procedures to analyze and interpret the data include: 1) a basic statistic descriptive analysis that compares index scores between higher and lower recreation diversity and community resilience CCA's; 2) a linear regression analysis to determine the linear correlation of the recreation diversity construct to community resilience; and 3) a geospatial analysis to interpret the geographic associations between CCA's and their respective recreation diversity-community resilience relationships.

Descriptive statistics is a procedure for summarizing scores and basic data for initial analysis. In order to test the hypothesis that greater recreation diversity leads to greater community resilience, the community resilience index means and recreation diversity index scores were split into higher and lower scores based on the global mean within each Index. The community resilience and adaptive capacity index global mean was calculated as 39.25. The recreation diversity index global mean was calculated as 75.58. The resulting data is displayed in Table 9.

Eight of 11 higher recreation diversity CCA's correlate with higher community resilience scores. High Recreation Diversity-High Community Resilience CCA's include Turnagain, Old Seward/Oceanview, Airport Heights, South Addition, Government Hill, Abbott Loop, Scenic Foothills, and Sand Lake. Six of 11 lower community resilience CCA's correlate with lower recreation diversity scores. Low Community Resilience-Low Recreation Diversity CCA's include Taku/Campbell, Northeast, Russian Jack Park,

Table 9 Higher and Lower Community Resilient and Recreation Diversity CCA's Based on Global Mean Scores (Resilience M=39.2, Diversity M=75.5)

| Higher Resilience CCA's | | |
|---|---|---|
| Rank | Community Council Area | Index Mean |
| 1 | Rabbit Creek | 41.86 |
| 2 | Huffman/O'Malley | 41.52 |
| 3 | Hillside East | 41.32 |
| 4 | Bayshore/Klatt | 41.31 |
| 5 | Old Seward/Oceanview | 40.79 |
| 6 | Turnagain | 40.69 |
| 7 | Scenic Foothills | 40.35 |
| 8 | South Addition | 40.25 |
| 9 | Government Hill | 40.19 |
| 10 | Sand Lake | 40.11 |
| 11 | Airport Heights | 39.83 |
| 12 | Rogers Park | 39.78 |
| 13 | Abbott Loop | 39.29 |

| Higher Recreation CCA's | | |
|---|---|---|
| Rank | Community Council Area | Index Score |
| 1 | Turnagain | 86.5 |
| 2 | Old Seward/Oceanview | 86.4 |
| 3 | University Area | 84.8 |
| 4 | Airport Heights | 83.3 |
| 5 | Downtown | 82.6 |
| 6 | South Addition | 81.4 |
| 7 | Government Hill | 80.0 |
| 8 | Abbott Loop | 78.5 |
| 9 | Scenic Foothills | 77.9 |
| 10 | Sand Lake | 76.6 |
| 11 | Campbell Park | 76.6 |

| Lower Resilience CCA's | | |
|---|---|---|
| 14 | Northeast | 38.31 |
| 15 | Campbell Park | 38.17 |
| 16 | Taku/Campbell | 37.85 |
| 17 | University Area | 37.83 |
| 18 | Downtown | 37.41 |
| 19 | Russian Jack Park | 37.37 |
| 20 | Spenard | 37.35 |
| 21 | Mountain View | 36.80 |
| 22 | Fairview | 35.14 |

| Lower Recreation CCA's | | |
|---|---|---|
| 12 | Rabbit Creek | 75.0 |
| 13 | Bayshore/Klatt | 75.0 |
| 14 | Hillside East | 75.0 |
| 15 | Taku/Campbell | 74.4 |
| 16 | Northeast | 71.9 |
| 17 | Huffman/O'Malley | 71.9 |
| 18 | Russian Jack Park | 69.4 |
| 19 | Rogers Park | 68.0 |
| 20 | Fairview | 66.7 |
| 21 | Spenard | 66.7 |
| 22 | Mountain View | 54.2 |

Fairview, Spenard, and Mountain View. Five of 11 higher community resilience CCA's correlate with lower recreation diversity scores. High Community Resilience-Low Recreation Diversity CCA's include Rabbit Creek, Bayshore/Klatt, Huffman/O'Malley, Hillside East, and Rogers Park. Three of 11 higher recreation diversity CCA's correlate

with lower community resilience scores. Low Resilience-High Recreation Diversity CCA's include University Area, Downtown, and Campbell Park.

The descriptive statistic data in of themselves above do not provide a clear predictive association between community resilience and recreation diversity. A total of 14 of the 22 (63.6%) of CCA's analyzed show a positive association where higher community resilience-higher recreation diversity and lower community resilience- lower recreation diversity relationships were encountered. On the other hand, eight of 22 (36.4%) CCA's provide an inverse relationship between community resilience and recreation diversity. Using descriptive statistics alone, it would lead to an inaccurate interpretation to claim that the descriptive data provide a predictive relationship, although the data trends do provide some support for an overall positive association.

Local knowledge of recreation activities and numbers of parks and trails and/or observing a city-wide park map might lead one to doubt low recreation scores in some CCA's. However, more easily observed park settings and recreation activities may be misleading and are subjective Activity-Based Management traps such as those described for ice skating in Chapter 3. It is far more complicated to accurately observe recreation experience and outcomes. The objective measurement of recreation opportunity diversity utilizing outcome dimensions of activity, setting, experience and outcomes may be a far better scientific method for testing community resilience and adaptive capacity. One may not have ventured a guess of high recreation diversity in the Downtown or Government Hills CCA's. One familiar with the recreation activities in Russian Jack Park may not have guessed a low recreation diversity score for Russian Jack Park CCA. The recreation diversity test tells a different story when objective testing is applied over subjective observation and an educated guess.

Linear regression tests the relationship between scores that are plotted as dots on a scatterplot diagram. To prepare the data for linear testing a new SPSS database was developed that combined the Community Resilience Index Mean Scores and the Recreation Diversity Index Scores for each of the 22 CCA's in the Anchorage Bowl shown in Table 9. Linear regression was tested through SPSS by choosing the Analyze-Regression-Automatic Linear Modeling option and the results are displayed in Figure 5. The correlation between resilience and recreation diversity is 0.44 and is statistically significant (p =0.039). Community resilience and adaptive capacity increases with increasing levels of recreation diversity.

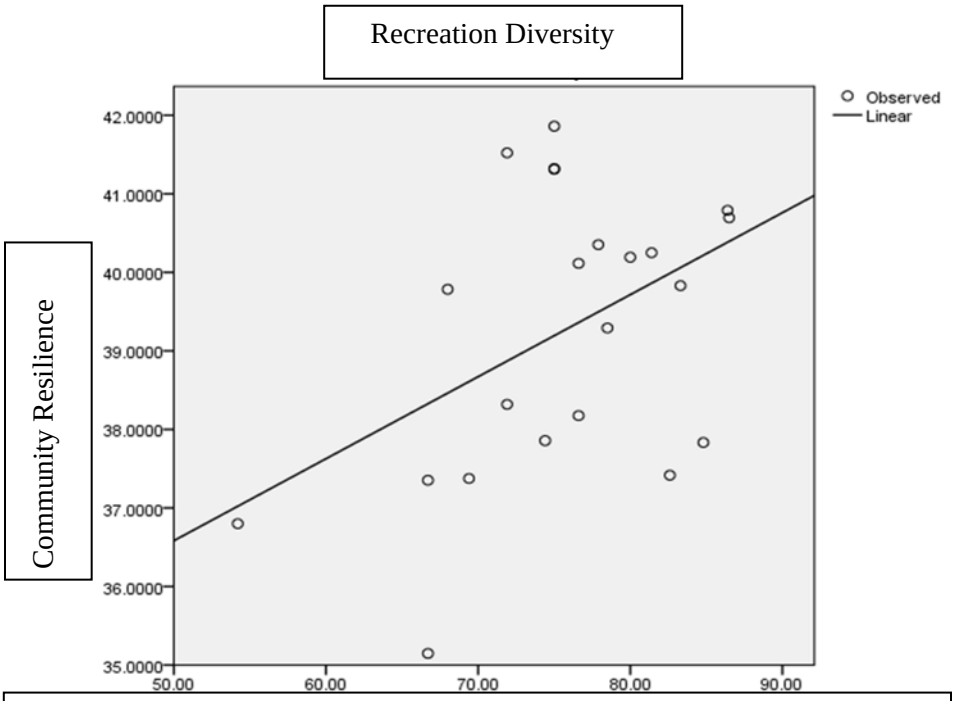


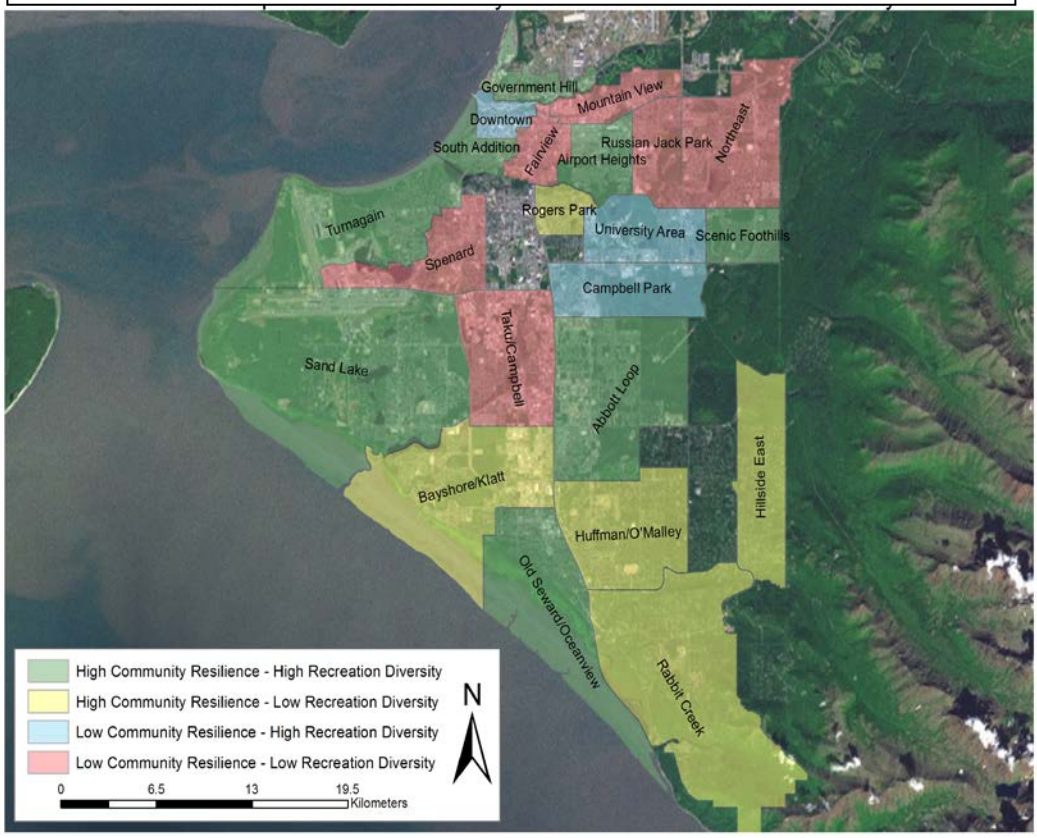

Figure 3 Linear Scatterplot of the Community Resilience and Recreation Diversity Scores

Fifteen of the 22 CCA's are proximate to the regression line. Seven CCA's including the Fairview, Downtown, University Area CCA's and the Rabbit Creek, Bayshore/Klatt, Hillside East, and Huffman/O'Malley CCA group in South Anchorage show weaker correlation. However, these CCA's all follow the predictive relationship in that high and

low levels of resilience are explained by corresponding high and low levels of recreation diversity as shown in Table 9. Additional linear tests were run to isolate the activity variable, the experience variable, the park (setting) variable, and the outcome variable to attempt to establish a linear predictive relationship in order to compare with the combined activity-park setting-experience-outcome recreation diversity construct variable. No linear relationships were found in these additional isolated variable tests.

For non-statistical analysis, the dataset was mapped using a Google Earth map of the Anchorage Bowl and a CCA boundary overlay from the Municipality of Anchorage. This geospatial analysis provides a graphic presentation of the CCA boundary in Map 1 and reveals relationships that were not readily apparent in tabular or statistical testing.

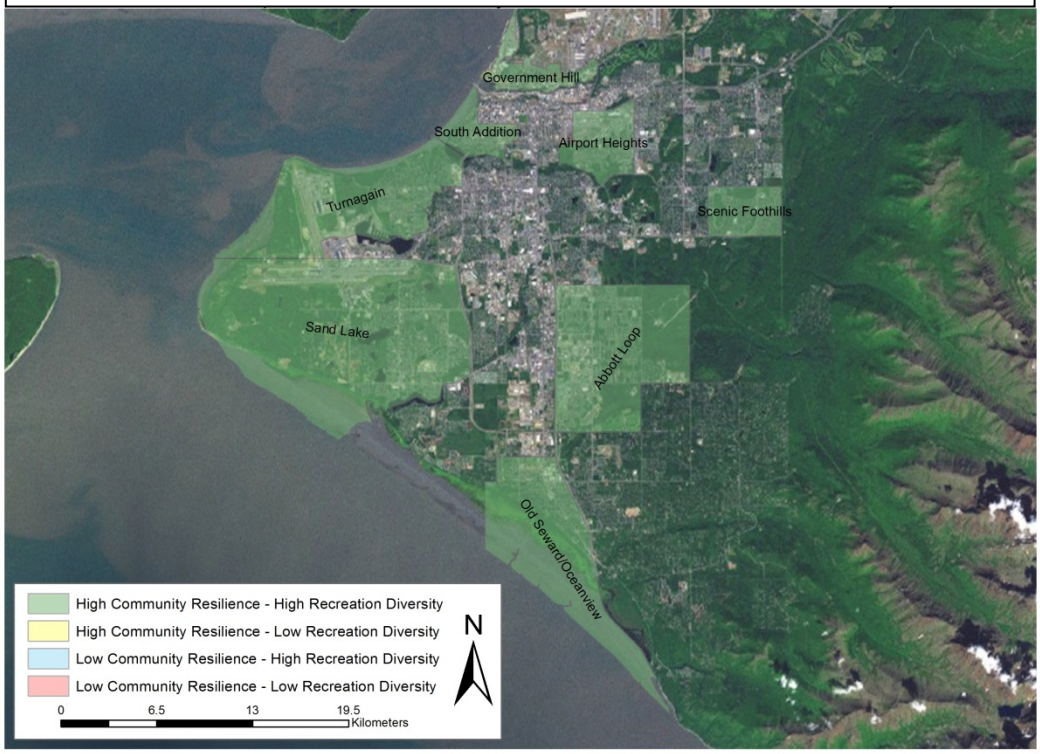
Map 1 Geospatial Distribution of Community Resilience and Recreation Diversity Relationships by Community Council Areas



For the purposes of this geospatial analysis, the Tudor, North Star and Mid-Hillside CCA's that were eliminated from statistical testing due to low sample bias are included in this geospatial analysis.

The High Community Resilience – High Recreation Diversity CCA's in Map 2 are all located on the eastern and western edges of the city adjacent to and accessible to coastal or mountainside open space, large parks and extensive trail systems. The CCA's in this category include Turnagain, Old Seward/Oceanview, Airport Heights, South Addition, Government Hill, Abbott Loop, Scenic Foothills, and Sand Lake. Two large parks, Kincaid and Far North Bicentennial dominate large geographic areas of the CCA's they reside in.

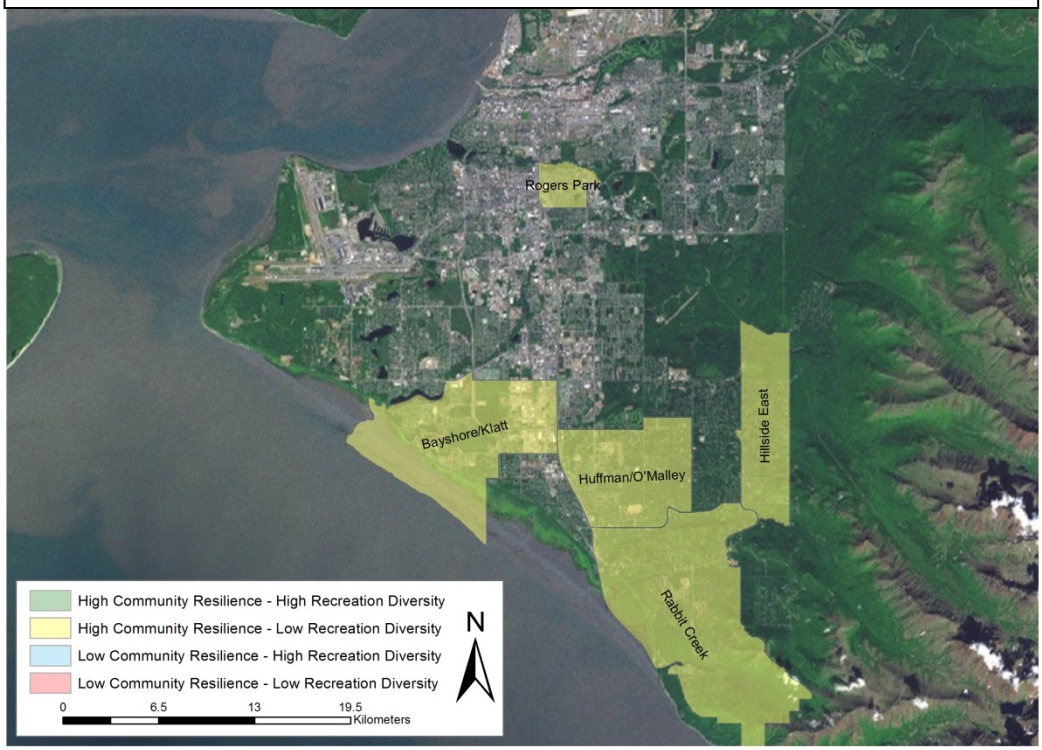
Map 2 Geospatial Distribution of High Community Resilience – High Recreation Diversity Community Council Areas



The Tony Knowles Coastal Trail on the west side and the hillside trail system in the Abbott Loop CCA includes linked trails managed by the Bureau of Land Management and Far North Bicentennial Park and trail access to Chugach State Park.

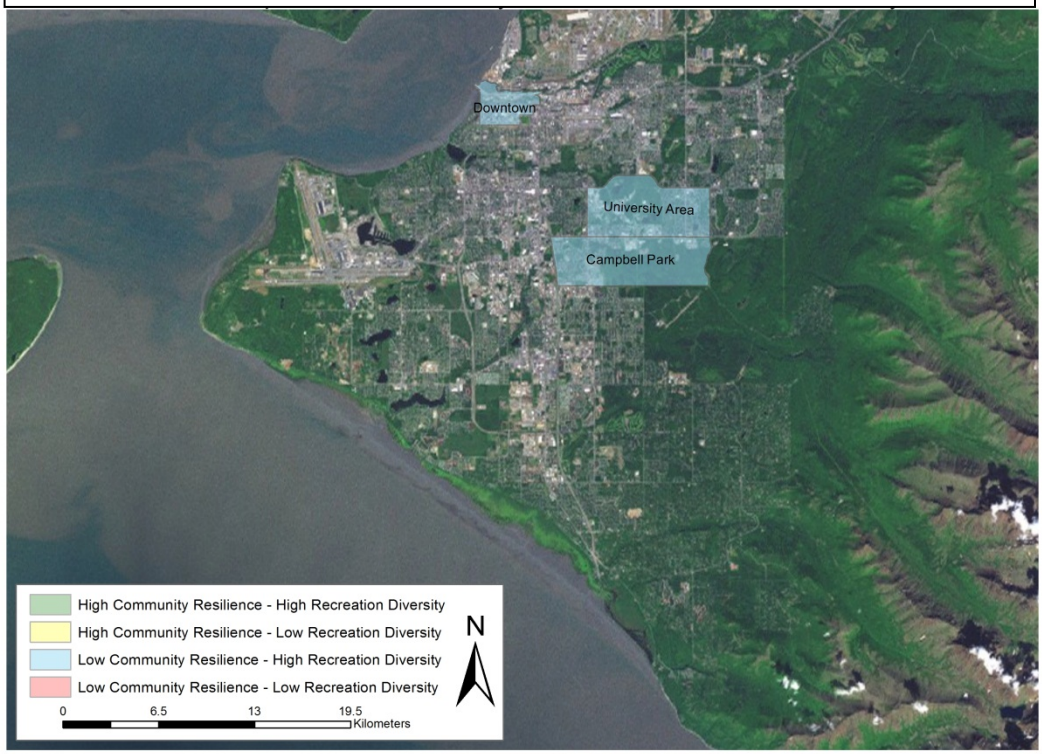
The High Community Resilience – Low Recreation Diversity CCA's concentrated in South Anchorage that border the urban-wild edge of the coast and Chugach Mountains in Map 3 are of particular interest and include Rabbit Creek, Huffman/O'Malley, Bayshore/Klatt, Hillside East, and Rogers Park. The higher community resilience scores in this block of CCA's are not surprising. The low recreation diversity scores are very surprising. The western sloping aspect of these CCA's provide western expansive views of the Cook Inlet and the Alaska Range, southern views of the Kenai Mountains, and eastern views of the Chugach Mountains. These long distance views provide a feeling of spaciousness along with being physically surrounded on three sides on a grand scale with natural scenery. One assumption of the research design was that local on-site place-based recreation opportunity is a critical element in matching socio-economic needs of the community with outcome provision of green spaces. Do visual and spacious off-site types of recreation experiences and outcomes one may get from the home or yard affect visitation to neighborhood parks in a manner that resulted in lower recreation diversity scores? Should these off-site amenities that were not measured in the Recreation Survey play a larger role in CCA recreation opportunity diversity that requires an adjustment to the survey instrument?

Map 3 Geospatial Distribution of High Community Resilience - Low Recreation Diversity Community Council Areas



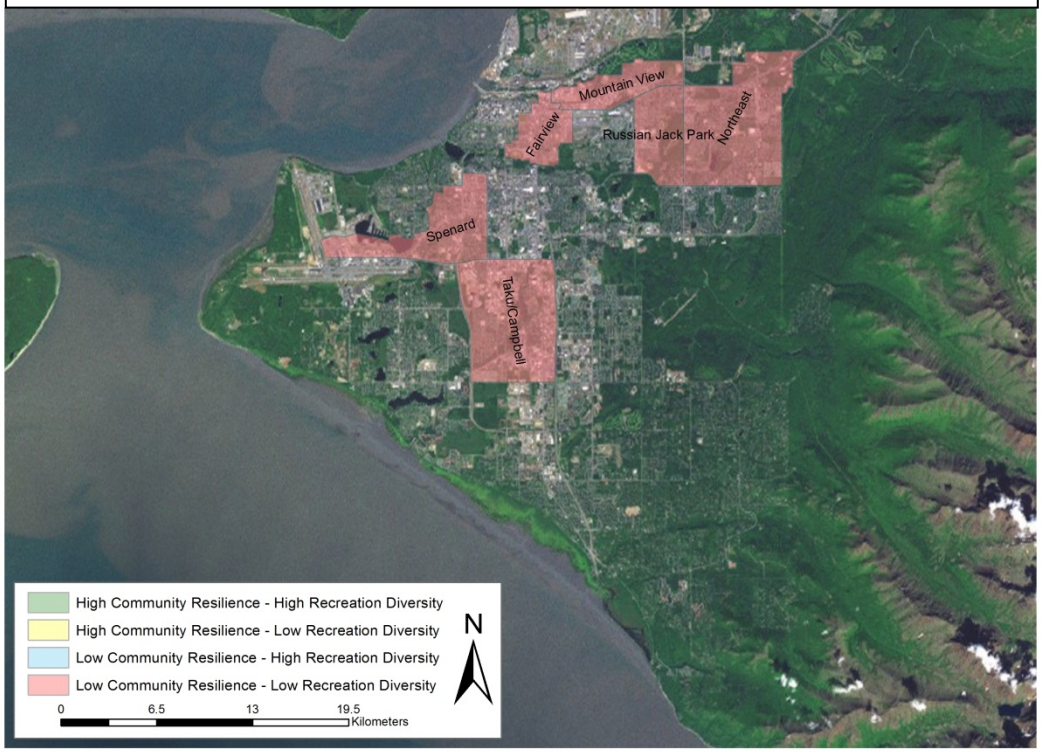

The Low Community Resilience – High Recreation Diversity CCA's in Map 4 run contrary to the hypothesis in that higher levels of recreation diversity are associated with lower community resilience and include University Area, Downtown, and Campbell Park. The Downtown CCA is unique in the Anchorage Bowl among the other CCA's, yet it higher recreation diversity score is related to the CCA's connection and location adjacent to the coast like similar higher recreation diversity CCA's. The Campbell Park and University Area CCA's are within and adjacent to the University of Alaska which is subject to yet different socio-economic and demographic influences and are located on the eastern fringes of town with trail access to the mountains and coast. There appears to be more than recreation-related issues leading to a lower community resilience score.

Map 4 Geospatial Distribution of Low Community Resilience - High Recreation Diversity Community Council Areas




The Low Community Resilience – Low Recreation Diversity CCA's in Map 5 are urban land-locked regions in North Anchorage downtown and interior midtown section of central Anchorage located away from large coastal and mountainside open space areas and include Taku/Campbell, Northeast, Russian Jack Park, Fairview, Spenard, and Mountain View. The lower community resilience scores and lower recreation diversity scores are not surprising given this mostly urban industrial and commercial zone.

Map 5 Geospatial Distribution of Low Community Resilience – Low Recreation Diversity Community Council Areas




## 5.4 Discussion

The linear test generally supports the hypothesis that recreation diversity fosters community resilience and adaptive capacity as the finding was statistically significant (Figure 3). The statistical relationship predicts greater community resilience as recreation diversity increases. The descriptive statistics and geospatial analysis and interpretation largely support a positive association where recreation diversity fosters community resilience, but do not show a convincing predictive relationship on their own merit. The geospatial test additionally suggests that in CCA's where community resilience is lower, recreation diversity may be a more important factor as fewer recreation opportunity

substitutes (diversity and redundancy) are available than in CCA's where recreation diversity is associated to higher community resilience and adaptive capacity (Maps 1-5).

The Recreation-System Community-Resilience Framework and data analysis findings support both Resilience and Adaptive Capacity and Recreation Theory in the elements for resilience, adaptive capacity, the systems approach, diversity, adaptive management, and panarchy. Both resilience and adaptive capacity elements were built into the Framework, measured in each neighborhood, and are reflected in the findings in that they were linearly related to recreation diversity to test the hypothesis.

The framework upon which the research design was centered was the systems approach for both resilience and recreation in that all-components of the system must be taken into account as well as the feedback mechanisms to all components to complete the circuit (Figure 1). It is the recreation system services produced by the system that feedback to system components to be realized as positive or negative outcomes. Incomplete or partial component models are a piecemeal approach that will inevitably yield less than desirable results as well as not considering or taking into account variables that that will interact with other parts of the system whether they are accounted for or not. Not accounting for various system components can result in negative consequences that lead to a more vulnerable system.

The diversity element in resilience theory was central in the research design and measurement of the recreation construct as proposed in BBM in that it is the variety of recreation opportunities at the neighborhood scale that is important in support of enhanced community resilience. The more diverse recreation opportunities in each neighborhood are, the more capability it has to constructively respond and allow residents

to adapt to their choice of activities in a preferred park setting to achieve their desired experiences and outcomes. The recreation diversity and community resilience association at the neighborhood level can be scaled up to describe the recreation diversity and community resilience levels at higher divisions of the municipality (i.e., groups of neighborhoods) and even at the greater Anchorage Bowl scale. Diversity helps ensure a robust reaction to system crisis or vulnerability to maintain resilience (Elmqvist et al. 2003). It is the variety of recreation opportunities that build the adaptive capacity for the community-recreation system and make it less vulnerable to change. Redundancy in recreation opportunities also plays a role in that repeated activity, setting, and experience opportunities are resilience insurance against changes in the system that might negatively affect a neighborhood. One may find a similar opportunity close by if it is redundant and offered in multiple green spaces in the neighborhood. In a resilient neighborhood, residents and visitors can make minor adjustments in their preferred activities, settings, and experiences to achieve desired outcomes. They are better able to adapt to changes in the system and still achieve valuable benefits from their leisure time choices.

Panarchy is evident in the research design and Recreation-System Community-Resilience Framework as identified in resilience theory in that green space is embedded in the neighborhood that is again embedded in the Municipality that is embedded in the regional social-ecological system outside of the Anchorage Bowl and to broader landscape systems (Hollings et al. 2002). Multi-level recreation agencies from city (Parks) to state (Chugach State Park) to federal (Chugach National Forest, BLM Campbell Tract) play a role in recreation diversity and community resilience. As migrating residents opt in and out of neighborhoods and as aging residents change the recreation user profile and recreation opportunity demand, recreation managers from the city to federal levels must continually monitor and re-evaluate recreation area management plans at each scale for

potential changes in management outcomes, experiences, settings and activities to adapt to resident needs.

The co-management element of the community network of recreation service providers that include recreation managers and recreation industry (i.e., outdoor retailers, hospitality providers) that exist at local to international scales operating locally heavily influence the production and delivery of recreation opportunity diversity and recreation system services. It is the embedded linkages between the social service providers and the connected socio-ecological systems from local to larger scales that apply to changes over time and space that provide increase opportunities for building adaptive, learning type opportunities that lead to more resilient human communities and their coupled ecological environments (Berkes 2002, Ostrom and Janssen 2004, and Olsson et al. 2004).

Of the 2028 total samples, there were 1,983 or 97.8% willing participants in the recreation survey. All CCA's had equal and random chance to respond to fulfill the target sample size. There were 1,418 who provided answers to all recreation diversity variable measures for a 71% effective response rate. Even with a target of 100 random samples per CCA and extra effort late in the recreation survey to eliminate calls to those CCA's over 100 samples and thereby increasing calls to those who had not reached 100 samples, the survey was unable to reach targets for all of CCA's. Careful review of Table 8 shows potential completed survey bias in that the recreation diversity index scores closely track with completed survey numbers. Thus, chances of larger recreation diversity score increases with number of completed surveys. Utilizing percentages for diversity instead of total numbers help to control for completed survey bias. Nonetheless, given the nature of the four variables in the recreation diversity construct, future studies

may want to consider equal completed surveys in the range of 200 samples to reduce this bias and provide an adequate sample in the measure of recreation diversity.

Future studies should also lean toward a written recreation survey methodology and eliminate phone surveys due to the nature of BBM variable measurement. Recreation diversity in this research was constrained by a phone survey to match the ACS methodology, which did not allow for testing a full range of recreation outcome dimensions. Typical BBM surveys include a local on-site interview and mail-back components necessary to articulate the experience and outcome dimensions for measurement. A limitation of this study is that only one of the four BBM outcome dimensions, the personal or individual outcome, was measured due to pre-testing which suggested elimination of social, economic and environmental outcome testing using the phone survey method. Future studies should look to incorporating these three outcome dimensions, which will act to further represent and to increase the chained recreation opportunity diversity.

Another limitation of the study was that it measured recreation diversity for the summer non-snow months. In order to include all seasons in the measurement of recreation diversity, future studies may want to include a methodology that is non-season specific or a year-round sampling period.

Future research designs should look to incorporate multi-variable and multi-construct data collection and analysis to better investigate the complex adaptive social ecological systems modeling. While the isolated recreation diversity construct was specifically chosen for this first study of recreation diversity and community resilience, the relationship would be more accurately revealed using other construct variables to

describe associations. There are probably more cross-variable reasons such as demographic, residential stability and justice-related constructs to mediate the relationship between recreation and resilience. Affluence and the ability to afford out-of-neighborhood recreation such as in the form of boating in Prince William Sound may have played a significant role in the South Anchorage High Community Resilience-Low Recreation Diversity CCA association (Map 3) in that neighborhood recreation diversity may have been less of a factor in community resilience and adaptive capacity than the less affluent CCA's with a Low Community Resilience-Low Recreation Diversity association (Map 5) were out-of-neighborhood opportunities may be less affordable.

In addition, the geospatial analysis raises the question to include non-park specific recreation-related experiences and outcomes in the definition of recreation diversity. Future studies may want to consider measuring off-site experiences and outcomes that residents receive from their homes and neighborhood that include off-site distant views, adjacent land use, and feelings of spaciousness.

# Chapter 6 Conclusion

The purpose of the dissertation was to test the hypothesis that recreation diversity fosters community resilience. The specific constructs to be tested were outdoor recreation opportunity diversity and community resilience and adaptive capacity. Linear statistical testing, geospatial analysis, and descriptive analysis generally support the hypothesis.

The dissertation was designed to advance knowledge in the first-time testing of resilience-recreation theoretical and operational relationships. The Recreation-System Community-Resilience Framework (Figure 1) was developed from the common conceptual elements in resilience and recreation theories that result in an agent-based conceptual model to simulate interactions and demonstrate feedback loops to all system components. Emergent positive and negative recreation system service outcomes that feedback to system components are proposed as a way of thinking about outcomes as the recreation system services produced by component interrelationships in much the same manner that Ecosystem Services are produced as human survival outcomes. Diversity, adaptive management, panarchy, and a holistic systems approach are key elements for resilience and adaptive capacity (e.g., Colding et al. 2003, Folke et al. 2003, Abel et al. 2006) and for recreation.

In applying resilience concepts to recreation, we readily observe that recreation activities, settings, experiences and outcomes change temporally and spatially among all classes of visitors and green spaces. Similarly, changes in recreation needs, desires and demands of the public change the system. Results have been difficult to predict and undesirable effects include displacing visitors due to not being able to meet basic and higher-level

benefit outcome needs. Additional undesirable effects include transforming the distinctive and unique character of green spaces so they are unable to produce highly valued outcomes. Reversing or restoring desirable benefit outcomes can be expensive and difficult to reproduce. The adaptive capacity to respond to change in recreation needs and behavior as well as react to physical, service, and infrastructure changes is critical to maintaining the valuable function of beneficial outcomes or recreation system services produced by the Recreation System (e.g., Driver 2008). The loss of resilience to absorb certain and unpredictable change make the recreation system vulnerable to losing the capacity (Folke et al. 2003) to generate highly valuable recreation services such as activity, experience and benefits output opportunities and resulting benefit outcomes to quality of life, society, economy and environment.

Application of the Benefits Outcome Approach to Leisure Theory and BBM to the theory and concepts of Community Resilience and Adaptive Capacity bridge the gap between the Community and its embedded Recreation System. The BBM provides a best fit with community resilience theory and an effective method for the recreation profession to be considered an essential public service. Community decision-makers then gain an important indicator of community resilience and adaptive capacity, which to date, has not occurred. Crompton (2008) raises a key question, "What can leisure services deliver more effectively and efficiently than other agencies or organizations, which contributes to the resolving important community problems?" If recreation agencies cannot explicitly bridge the gap between recreation system service outcomes and their contribution to community health, well-being, resilience and adaptive capacity, it will continue to be labeled a non-essential public service. The U.S. Bureau of Land Management Connecting with Communities Strategy (2014) states, "by increasing and improving collaboration with community networks of service providers (e.g., governmental agencies

and recreation-tourism businesses), the BLM will help communities produce greater well-being and socio-economic health and will deliver outstanding recreation experiences to visitors, while sustaining the distinctive character settings of public lands."

Anchorage, Alaska Community Council Area neighborhoods were the testing ground that utilized the recreation BBM to collect recreation system service outcome data to compare with the community resilience and adaptive capacity data of the University of Alaska-Anchorage Justice Center's Anchorage Community Survey (Myrstol and Langworthy 2005). The research results show a positive relationship between outdoor recreation diversity and community resilience and adaptive capacity. Neighborhoods that show an inverse relationship of higher resilience-lower recreation diversity or higher recreation diversity-lower resilience appear to require a multi-construct research approach involving more than just the isolated recreation diversity construct to better understand the variability and recreation relationship to community resilience.

Increased knowledge of recreation system service outcomes for green spaces at the neighborhood scale allow community decision makers to relate park and recreation management products directly to levels of community health, resilience and adaptive capacity for each neighborhood. Management at the recreation service outcome level provides direct information about diversity and redundancy of recreation setting, activity, experience, and outcomes to make informed decisions on community resilience and adaptive capacity. Management at the outcome level also allow park and open space managers to make informed decisions on the biophysical, social and operational settings and facilitation of the community network of service providers to provide a leveraged approach to co-management. Value-driven outcome information allows service providers to understand feedback mechanisms to make business decisions based on value-added

services, programs and projects. In such a manner, all services and programs are constrained to the most value-added services that produce desired outcomes of residents and those that reduce duplicative and unnecessary services that add little value to community well-being and resilience.

In order to realize the benefits of the recreation-resilience relationship and the resulting increased community resilience and adaptive capacity, recreation planners must fully invest in the Recreation Benefits-Based Model to produce recreation system service outcome data for management purposes as well as to connect with resilience professionals in working toward more resilient, sustainable and healthier communities. The data can also be used to develop management plans complete with outcome-based objectives, setting prescriptions, and facilitate the network of community-centered service providers to implement management actions to provide services and programs necessary to achieve the targeted goals in community resilience and adaptive capacity. Without outcome data, the disconnect between recreation and resilience will continue and recreation will be unable to provide site-specific information on how management of public green spaces directly connect with quality of life for citizens, healthy communities, productive economies, and sustainable environments in the greater and more complex social-ecological system. Intuitive knowledge that recreation is good for society does not provide the scientific information on recreation system outcomes to provide more effective park and recreation management and healthy more resilient communities.

Recreation systems do not operate in a static state. People migrate in and out of setting-activity-experience-outcome opportunities throughout various phases of their lives. Preferences and recreation demand change in evolutionary fashion with trends and

changing technology. Diversity in recreation system services is key to community resilience and adaptive capacity in that it needs to retain the flexibility to make setting, activity, experience and outcome adaptations over time to maintain the neighborhood within a desired state of optimum community health. Planning and management of the recreation system embedded in the community system that is again panarchically embedded in larger regional social-ecological systems require continual assessment and monitoring of community resilient indicators which need to include recreation system service outcomes.

Another example of the how recreation BBM might work in community resilience is with a change in master plan zoning. In this case, a portion of Far North Bicentennial Park was proposed for change in an estimated 100 acres of the mostly rolling wooded 15,000 acre park from a forested trail setting into a clear cut and ground leveling for ball parks and soccer fields among other support facilities. The Abbott Loop Community Council Area neighborhood and greater Anchorage debate raged on with one side supporting developed facilities for youth and other side protesting the loss and clearing of any more forest for any kind of development. This debate pitted the developed side of the recreation spectrum versus the undeveloped natural side with the city council engaged in taking sides. A BBM study would have taken the highly emotionally charged debate which created much anecdotal information on preferred settings, activities, experiences, and outcomes and systematical quantified and qualified these variables for decision-making based on quality of life, community health, economic benefit, and ecological sustainability as well as resilience and adaptive capacity. BBM would have: 1) developed a fair public process for gathering resident and visitor demand data for all four outcome dimensions; 2) defined a reasonable set of alternatives to be considered; and 3) identified outcome-driven beneficial outcomes to be managed for and negative outcomes

to be avoided. In addition, involving the community network of service providers would have resulted in co-management and cost share leveraging possibilities. Setting prescriptions for biophysical, social and operations would have been identified to best achieve the desired outcomes. Armed with outcome-related data, a regional analysis would have been able to inform the decision-making process in terms of the overall impact of taking more undeveloped open space and the set of outcomes produced as green space and compared that to anticipated outcome values from transforming the forest onto ball fields. This analysis could then be taken to the next level to determine the impacts to community resilience and adaptive capacity. Was the proposed development anticipated to build community resilience and adaptive capacity by diversifying recreation opportunities by decreasing diversity? Studying the situation through BBM is the path to bridge recreation management and community resilience in a systematic scientific methodology as opposed to emotional community debate where often the loudest user group arguing for a particular type of recreation activity or most politically connected wins the day. Until residents and visitors are asked about their preferred settings-activities-experiences-outcome chained preferences, and positive and negative outcomes are taken into account, the desired and most resilient results would be unknown and unavailable to decision-makers.

Statistical and geospatial analysis of Community Council Area neighborhoods in Anchorage, Alaska establishes foundational information to pursue to more effectively managed park and recreation opportunities to build community resilience and adaptive capacity. Neighborhoods that contain low community resilience could be targeted to improve community health and well-being by enhancing its recreation activity-setting-experience-outcome diversity opportunities to better serve all segments of its neighborhood population and beyond. Neighborhoods with low recreation diversity

(Table 9, Map 5) opportunities could be targeted for providing greater diversification through open space acquisition or changing existing park management to provide for greater diversification of settings, activities, experience and outcome products.

This rare application of BBM to outdoor recreation in an urban area hopefully will expand the possibility of its use by urban planners and park administrators. Previously, BBM was best known in recreation research that focused on vast expanses of federal lands, apart from communities. These large tracts include State Lands, Bureau of Land Management Public Lands, Forest Service National Forests, Fish and Wildlife Service National Wildlife Refuges, and Park Service National Parks.

"Neighborhood green spaces, small or large, can help foster the family and community bonds that lead to social cohesion … and is critical for building trust and social capital in our neighborhoods and communities. Neighborhoods with parks reported higher levels of mutual trust than their counterparts living in neighborhoods without parks" (Parks Canada 2014).

A final overarching question regarding Anchorage Bowl CCA's in Map 5 with low community resilience-low recreation diversity relationships is; would increasing recreation diversity in activities, experience, settings and outcomes increase community resilience and adaptive capacity in those CCA neighborhoods? If we use the designed experiment concept (Walters 1997) of resilience theory blended with outcome-focused BBM (Driver and Bruns 1999) and the recreation diversity construct, would neighborhood resident social cohesion and trust, informal social control, and social participation scores increase to foster improved community resilience and adaptive capacity?

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